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STEEL

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PRODUCTION · PROCESSING · DISTRIBUTION · USE

3 "WAYS" *agree on* 1 FACT

MODERN METALS REDUCE OPERATING COSTS

RAILWAYS

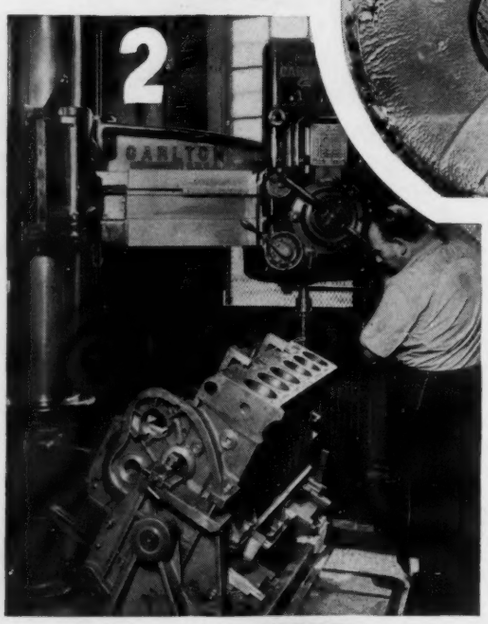
General Motors' use of Nickel alloyed iron in Diesels for these Santa Fe streamliners cut weight per H.P. Nickel-chromium iron is tougher, retains strength at high temperatures, and wears longer.

Railways, highways and waterways present varied operating problems. But each transport system agrees operating costs can be reduced by utilizing modern materials—such as Nickel alloyed cast irons.

For new equipment or replacement parts, take full advantage of the money-savings made possible by modern metallurgy and engineering. Make each ounce, each inch of metal carry bigger loads, resist harder wear, by specifying the correct alloy strengthened and toughened with Nickel.

WATERWAYS

28-inch dredge liners used at Ft. Peck Dam. Under identical conditions the liner at left above, rolled from plain steel wore out after handling less than 1½ million cubic yards. The liner at right above cast from Ni-Hard—the abrasion-resistant Nickel iron—withstood 2-1/3 million yards and after inspection it was put back in service to add millions more yards to its career.*



Mack Mfg. Corp. casts these heavy duty truck cylinder blocks in their own foundry from Nickel alloyed iron. Nickel increases machinability, permits drilling at speeds 1½ times faster than in other irons of same hardness.

NICKEL CAST IRONS

HIGHWAYS

*Reg. U. S. Pat. Off. by The International Nickel Company, Inc., Canadian Patent No. 281986

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ THE BUSINESS tide has turned, says STEEL'S editor-in-chief (p. 29), because the man-in-the-street wants sound recovery and less theoretical reform. In that change lies a stimulant for business sentiment more powerful than anything that has happened in this country in a decade; marketers of industrial products can afford to adjust their activities to accord with this change in public opinion. . . . Recent technological developments, according to leading oil authorities (p. 23), will have a profound effect on oil refinery construction; the new processes permit production of high-octane gasoline from low-grade crudes and offer other advantages. An increase in the requirements of refinery equipment made of steel and alloy steels is foreseen.

• • •

Mr. Roosevelt and Secretary Hopkins do not like the term "business appeasement" (p. 32); also, the outlook for "appeasement" is less rosy at Washington than in recent weeks. Despite much fine talk, very little actually is being done to help business. In particular, prospects for a revision in the Wagner act and for an overhauling of the tax system aimed at encouraging business are not so good. . . . Eastern steelmakers (p. 32) failed in their effort to keep the labor department from forcing them, under the Walsh-Healey law, to raise their minimum wage rate from 56½ to 62½ cents an hour; they are appealing to a higher court. . . . Deferred maintenance on American railroads has mounted to $283,000,000; in addition (p. 34) these interests should spend $495,000,000 over the next three years.

Blow Hot, Blow Cold

• • •

Instead of destroying employment, as has been stated in many uninformed quarters during the depression years, machines create it on a large scale by their ability to lower costs, according to the fact-finding committee of the American Society of Tool Engineers, in reporting to that body last week. Industry was urged at this convention to modernize and bring costs down (p. 25) so as to improve our average living standard. Daily attendance at the tool exhibition ran as high as 7000. . . . Business is a little better. The aviation industry (p. 35) continues to expand. February, usually seasonally low, reflected a gain (p. 41) of 16.3 per cent in machine tool orders. STEEL'S index of industrial activity again is advancing (p. 43); it now stands at 92.7.

Machine Orders Up

• • •

Welded construction saves 40 per cent in the cost of fabricating a portable paving plant (p. 49) that has sufficient capacity to keep up with new paving mixture spreading equipment and the high-speed trucks now used by contractors. . . . Roll grinding is discussed by a well-known authority who (p. 46) reveals the causes for specific defects and recommends best practice for various kinds of rolls. . . . Circular annealing covers for strip steel in coils have resulted (p. 52) in increased uniformity of product at one plant and in a 50 per cent cost reduction due to lower gas consumption, faster cycles and improved finish. . . . A number of new specifications and tests and many modifications in existing standards have been approved (p. 66) by committees of the American Society for Testing Materials.

Points on Grinding

• • •

The oxyacetylene process continues to simplify manufacturing and maintenance problems, it was shown recently at the annual meeting (p. 56) of the International Acetylene association; discussion had to do largely with applications in the oil industry. . . . Modern steel strapping methods, with inexpensive wood skids make it easier to package many small or awkwardly shaped pieces for convenient handling (p. 59); new methods also permit packaging of steel bars and structural shapes for easier handling. . . . A new annealing furnace enables one company to obtain more uniform grain structure in high carbon and alloy steel bolt stock. In particular, it is useful (p. 62) in producing material that withstands in a notable way severe upsetting operations in cold heading.

Simplifies Manufacture

E C Kreutzberg

Scene in Inland's modern annealing department

INLAND solves forming and deep drawing problems

Here in Inland's modern mills and sheet finishing departments, the ductility and temper of iron and steel sheets and strip undergo profound changes.

Here many difficult forming or deep drawing problems are solved. They are being solved for Inland customers every day. They can be solved for you.

Here the workability required for the deep drawing of a washing machine tub or bullet-type automobile fender, or the stiffness required of a door panel are bred into Inland sheets and strip by heat treatment.

Cut Down Spoilage Costs

Spoilage is prevented by knowing your exact requirements. For example, one manufacturer had resorted to spot annealing with a blow torch to prevent breakage when the edge of a deep-drawn receptacle was turned down in a later operation.

Since using Inland sheets specially annealed for his purpose, this operation has been entirely eliminated at considerable saving . . . and there has been practically no spoilage from the second forming operation.

Don't Overlook a Problem

His problem was solved through the call of an Inland metallurgist at his plant. The economy was unexpected. Such an opportunity may exist in your plant, too. An Inland metallurgist will gladly check the possibility with you or your shop men. There is no cost or obligation for his service.

INLAND STEEL CO.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

New Oil Refining Methods, With Heavy Expenditures, Significant to Steel

NEW YORK

■ OIL REFINERY construction in the next decade will be influenced to a great extent by recent technological developments — notably the catalytic refining processes — leading refining authorities believe.

These processes, just emerging from an experimental stage, are likely to necessitate extensive replacements and alterations in the oil industry's $2,000,000,000 refinery system, raise steel requirements to a level comparable to that prevailing in the 1920's.

For the current year substantial increase in refinery building is seen. Estimates of expenditures for new construction and maintenance in the United States center around $150,000,000, much better than last year, and somewhat above average. Another $50,000,000 will be expended in other parts of the world.

Refinery construction has been retarded recently by the knowledge revolutionary advances were being made. Their exact nature was not generally known, but the industry was sufficiently aware of them to mark time pending details.

First important revelation of what these processes may mean to the oil industry came last November when Arthur E. Pew Jr., vice president, Sun Oil Co., Philadelphia, described the now-famous Houdry process before the American Petroleum institute in Chicago.

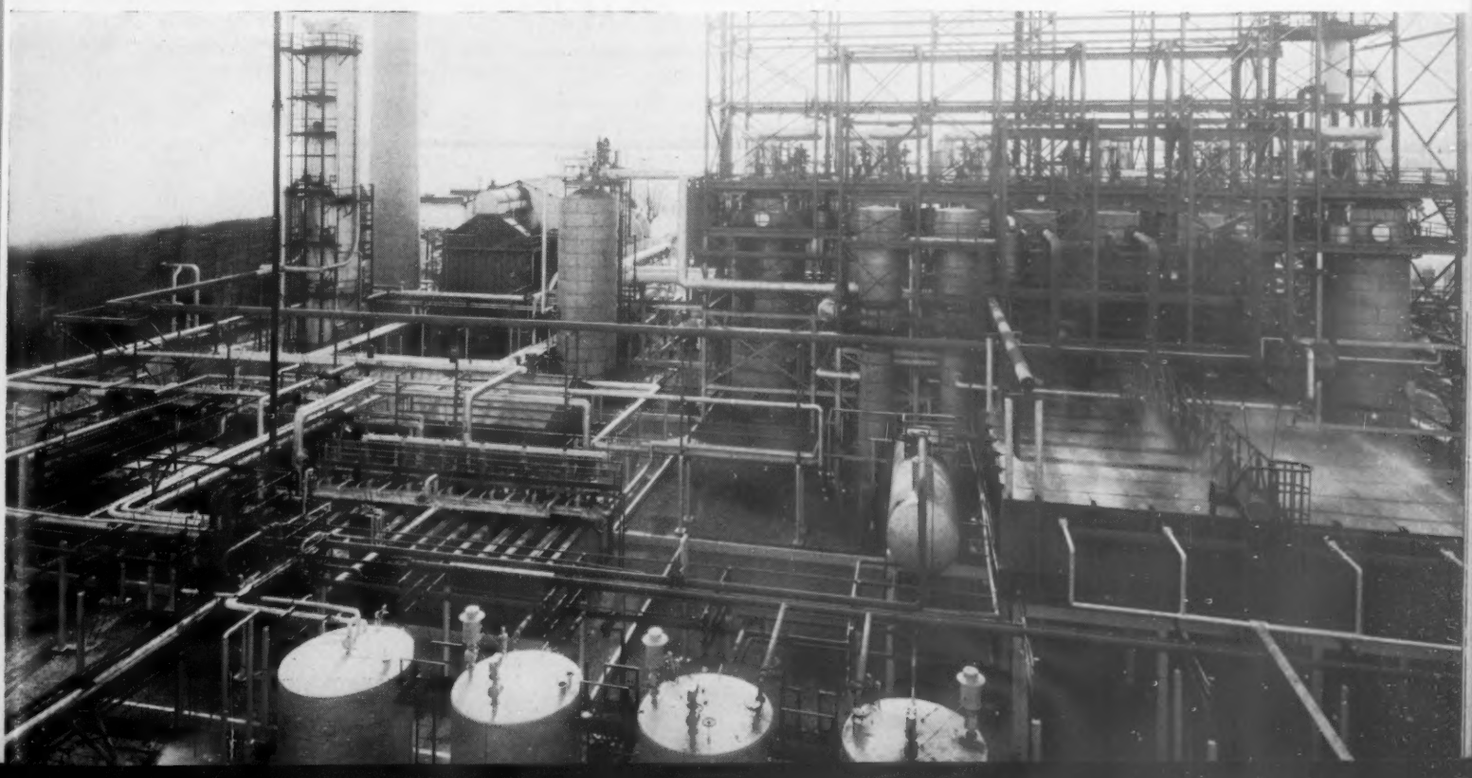
The Houdry process, he said, makes possible an 80 per cent yield of high-grade gasoline from crude oil; existing methods have given an average of 44 per cent, although this has varied widely.

Moreover, said Mr. Pew, it no longer would be necessary to build up heavy excess stocks of fuel oil and other less profitable products; amount of each product obtained could be adjusted to the demand.

The Houdry process also makes possible refining gasoline of 80-octane rating, against a prevailing average of 71.

These and other statements, backed by much convincing evi-

■ **Sun Oil Co.'s Marcus Hook, Pa., works has capacity for 15,000 barrels daily. This was the first refinery using the Houdry process to be placed in operation. National Petroleum News photo**



dence, the authority of the speaker, and the knowledge of millions spent for research, made a profound impression in the industry.

Spotlight on this process also brought into clearer relief certain processes of similar character under development. Sponsors have not considered it expedient to divulge many details, but there are at least two such processes, excluding Houdry; and possibly three, which are now being watched closely.

One is sponsored by the M. W. Kellogg Co., New York, co-operating with Standard Oil Co. of New Jersey, Standard Oil Co. of Indiana and the I. G. chemical group of Germany. Another is sponsored by the Universal Oil Products Co., Chicago, licensor of the Dubbs thermal cracking process, with the Texas Co., the Shell Union Oil Corp. and the Consolidated Oil Co. all affiliated in one degree or another. Still another process is reported being developed by Standard of New Jersey.

Houdry Method Jointly Owned

The Houdry method was developed by the Houdry Process Corp. of Delaware, which is jointly owned by the Socony-Vacuum Oil Co., the Sun Oil Co., and Eugene Houdry and his French associates.

Most important claim for catalytic processing, from a broad viewpoint, lies in the conservation of oil reserves by its ability to make high-grade gasoline from low-grade crudes.

Its importance is emphasized by national defense considerations. Airplane engines, to operate at best efficiency, require 100-octane gasoline. At present direct distillation of high-grade crudes generally is necessary, but even this brings up the octane count to only 73, with a result tetraethyl and iso-octane must be added. Catalytic processing could reduce the necessary quantity of these expensive additions.

Another important claim lies in the control of quantity of each product obtained from crude oil, through which production can be adjusted to better meet demands as they arise. It is pointed out that in the summer when demand forces gasoline production to its peak, it will not be necessary to produce, as by-products, such large quantities of fuel oils, which must be stored until winter. In winter it will not be necessary to store excessive quantities of gasoline, while stepping up fuel oil production.

Whatever may be the effect of these new processes, few anticipate any such revolutionary sweep as attended the introduction of thermal cracking methods, but the next five or ten years may witness a considerable transformation. Existing methods did not come into broad application quickly. Patents on the famous Burton process were taken out in 1913, and on the Dubbs process in 1915; it was 1920 before cracking came into widespread use, and 1936 before cracking actually exceeded "straight run" in point of production.

There are, it is noted, various restraining factors. Gasoline demand continues to expand. Consumption last year reached a new peak at 21,600,000,000 gallons, against approximately 14,700,000,000 gallons in 1929. However, capacity is not seriously pressed. Efficient thermal cracking plants, able to get 65 to 70 per cent from a barrel of crude, find no great difficulty meeting present demands. Hence, they can coast along until recent developments take clearer form. A 78 to 80 per cent recovery of gasoline from crude is not yet imperative. Further, a certain amount of lubricating oil, fuel oil and kerosene must be produced.

While the trend undoubtedly is toward a higher octane gasoline, the fact remains many automobiles built today do not require extremely high quality fuel. It is authoritatively stated only 10 per cent of the cars have been designed to run on 78-octane or higher gasoline; 60 per cent on no more than 70; and 30 per cent, 65. Aviation requirements, with their high standards, are increasing, but constitute only about 5 per cent of the gasoline consumed in this country.

Developments "Around Corner"

New developments in the processing of lubricating oils and fuel oils and other lesser products also must be considered. There is talk of alkylation, isomerization, dehydrogenation and other processes, "just around the corner."

Some believe catalytic processes will never occupy more than a complementary position in oil refining, but all agree they are definitely in the ascendancy. Heavy expenditures already made and proposed for commercial construction are significant.

For instance, there are four Houdry plants in operation. The first, cloaked in secrecy, started production two years ago this month; it is Sun Oil Co.'s at Marcus Hook, Pa. Three plants have been completed since for the Socony-Vacuum Oil Co. at Paulsboro, N. J., Beaumont, Tex., and Naples, Italy.

Socony-Vacuum is now spending $21,000,000 on seven additional plants and Sun, $11,000,000 on two new plants. These will have capacities of 10,000 to 18,000 barrels daily. Recently three new Universal catalytic units have been announced for the Shell Union Oil Co., Consolidated Oil Co. and the Texas Co.

Incidentally, the trend in oil refinery capacity is toward larger units, as reflected in comparative figures for 1935 and 1938. In the former year, 496 active refineries had total capacity of 3,815,470 barrels daily; last year, the number of refineries in operation had dropped to 451, but capacity had expanded to 4,301,910 barrels. In 1928, 315 active refineries had total capacity of 3,116,930 barrels.

Unit for unit, catalytic equipment requires about the same amount of steel as the thermal cracking, although alloy specifications are influenced by the fact that less heat and pressure are required. Thermal cracking pressures range from 200 to 3000 pounds per square inch, and temperatures from 860 to 1200 degrees Fahr. The Houdry process operates at temperatures of around 900 degrees, with pressures of only 20 to 40 pounds.

Yet apart from these considerations, there are those who believe that other individual and contingent factors may even increase the relative use of alloys, particularly as catalytic processing develops.

Inventor Houdry had the basic principle of his process in hand as early as 1927, although millions have been spent in further research and experimentation since. The process uses a mixture of silica and alumina as catalytic agent through which oil vapor is passed. The mixture, in keeping with the accepted function of a catalyst, assists in an all-important chemical reaction, itself remaining unaffected.

Socony-Vacuum and Sun at present, it is said, are using Houdry processed gasoline to raise the octane count of other types and will probably not place it on the market direct much before next year.

$1,500,000 Spent for Air Conditioning at Fair

■ Seventy-two air conditioning systems, costing approximately $1,500,000, are scheduled for installation at the New York World's fair, according to W. B. Henderson, executive vice president, Air Conditioning Manufacturers' association, Washington.

Equipment already planned will have aggregate capacity of 5412½ tons of refrigeration, equivalent to that many tons of ice being melted every day to cool the air.

The Chicago fair in 1933 and 1934 used only 750 tons of air conditioning, Mr. Henderson points out. Foreign nations will use more than one-fourth the total being installed.

Tool Engineers Declare Machines Create, Not Destroy, Employment

DETROIT

■ DRAMATIC evidence of the contributions of the tool engineering fraternity to manufacturing industry was to be noted in Detroit last week as the American Society of Tool Engineers held its second annual convention and exhibition.

From Tuesday through Saturday, crowds surged through Convention Hall inspecting exhibits of 253 manufacturers and suppliers of tools, machines and related equipment. Starting from a low point of 1300 on Tuesday, attendance mounted to 6400 on Wednesday, 7000 on Thursday, and held at about this level for the three remaining days.

Exhibitors generally were well satisfied with the attendance, which because of certain restrictions placed upon registrants was of a higher caliber this year than at the show last year.

New Officers Elected

At a directors meeting Thursday, the following new officers were nominated, and elected at the annual dinner of the society that evening: President, James R. Weaver, director of equipment purchases, inspection and tests, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; first vice president, A. H. d'Arcambal, consulting metallurgist and sales manager, Pratt & Whitney division, Niles-Bement-Pond Co., Hartford, Conn.; second vice president, E. W. Dickett, proposals engineer, Sundstrand Machine Tool Co., Rockford, Ill.; secretary, Floyd W. Eaton, Burroughs Adding Machine Co., Detroit; treasurer (re-elected), Frank Crone, chief tool designer, Lincoln Motor Car Co., Detroit. Ford R. Lamb, 2567 West Grand boulevard, Detroit, continues as executive secretary.

Decision also was reached at the directors' meeting not to hold a machine and tool progress exhibition in 1940, despite attractive offers from other cities, including Cleveland and Chicago. The next exhibition probably will be held in 1941.

Recognizing that steady refinement of productive capacity of American industry has brought living standards to the highest level of any country in the world, speakers at the preview dinner meeting in Convention Hall, Monday, marshalled an array of facts which effectively put the lie to oft-heard statements blaming mechanization for unemployment.

James R. Weaver
Elected president, American Society of Tool Engineers

Some 300 guests attended the dinner which was sponsored by a committee headed by W. S. Knudsen, General Motors Corp.; K. T. Keller, Chrysler Corp., and Alvan Macauley, Packard Motor Car Co.

Considerable interest attached to the presentation of the preliminary report of the society's fact-finding committee, under direction of John M. Younger, professor of industrial engineering, Ohio State university, Columbus, O., which for the past several months has been investigating the effects of mechanization on employment and social conditions.

Prof. Younger opened his report by citing definite figures which showed how mechanization or the installation of improved and more efficient productive capacity had lowered the prices obtained for a whole host of commodities, ranging from foodstuffs to watches, from adding machines to glass bottles. In the case of cold-rolled sheet steel, for example, new types of rolling mills have meant a reduction in the cost per ton from $102 in 1923 to $59 in 1935.

Irrefutable figures demonstrate that machines, instead of destroying employment, create it on a large scale by their ability to lower costs. However, there are some adverse factors which minimize the effect of production equipment to lower costs, the first and most important of which is taxes which now absorb some 17 per cent of national income. Effects of women workers on industrial employment, and the apparent increase in costs of distribution of products are other adverse factors.

Further Reports To Come

Attempts now being made to reorient temporarily displaced workers and to train them for more flexibility in capacity were mentioned in conclusion by Prof. Younger, who emphasized that his report was purely a preliminary one and would be followed by others as work of the committee progresses.

Other interesting factual data on the subject of machines and employment were capably presented in a feature address by Dr. Harold G. Moulton, president, Brookings institution, Washington, who traced from its early inception the age-old fear which men have expressed over the introduction of machinery. However, statistics prove beyond doubt that since the beginning of the so-called industrial revolution in 1775, improvements in the standard of living have far outstripped advances

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■ **About 300 invited guests, including industrialists, legislators, educators and clergymen, attended the "preview dinner" preceding the exhibition and convention of the American Society of Tool Engineers in Detroit. They heard discussions on mechanization and employment**

made in all the centuries preceding this date.

The case of a single company was presented by Dr. Moulton. In 1870 this company started with 300 employes, working 60 hours per week, earning an average of $465 per year on sales amounting to $550 per employe. Thirty-eight years later, in 1908, this company employed 3000 employes, still working 60 hours per week and earning an average of $624 per year, with sales up to $1986 per employe. In the next 28 years, or by 1936, the company had invested $30,000,000 in machinery and additions to productive capacity, and in this interval employment ballooned to 7337, hours in the work week dropped to 40, average annual earnings rose to $1698 and sales amounted to $9175 per employe.

In the period 1900-1929, according to Dr. Moulton, the figures for all manufacturing industry show a 314 per cent in improvement in physical properties, a 142 per cent improvement in productivity per man-hour, a 107 per cent improvement in real wages, a 216 per cent improvement in total wages, and an 88 per cent improvement in volume of employment.

Progress Will Continue

The question often has been asked lately: Are we finally at the end of the road in technical progress? And the answer is definitely in the negative when it is considered that 60 per cent of the families in this country, in spite of the high standards of living, earn less than $2000 yearly, leaving scant margin for comforts and luxuries to which many are accustomed. To satisfy this deficiency, a national income of twice the 1929 level of 81 billions would be required, and until this has been achieved it is useless to speculate about the end of technical progress, for only by technical progress can this doubling of national income be achieved.

Dr. Moulton enumerated three elements in the production task confronting industry now: (1) make good the deterioration of plant and equipment which has occurred since the depression of 1932; (2) increase productive capacity to supply the needs of the increased population of the country—7 per cent in the last ten years, and (3) expand the outlets for consumer goods to accommodate the increase in potential customers.

Theories Are Faulty

There are a number of forces which government economists and theorists have cited to prove that technical progress has slowed down or must be slowed down. They include the disappearance of the last of the country's frontiers; completion of the building of all great industries, with no new ones in sight; declining rate of population growth, forecasting a static level shortly; and the persistence of depressed conditions over the past decade. But, as Dr. Moulton pointed out, these theorists overlook one vital factor—the unfilled wants of the present population, and this constitutes one of the dual functions of industry in addition to fulfilling the needs of an increasing number of people.

In other words, while the *extensive* frontiers of development may have disappeared, there still remain vast unexplored *intensive* frontiers of development to cultivate. To promote these latter frontiers, an increase of the purchasing power of the masses is vital. This can be accomplished only by increasing the spread between wage rates and prices, which must of necessity arise from an increase in the efficiency of production.

Thus industry must view the road to progress, and in the opinion of Dr. Moulton no amount of government pump priming or building up of deficits in the guise of investments in national assets can smooth the way. Only by increased efficiency of productive equipment can prices of industry's products be lowered and made available to more people and thus create more employment and higher wages in an ever-widening circle.

A symposium on mechanical surface finishing was the highlight of the two technical sessions scheduled during the week, and a throng of about 1900 packed the lecture room to hear six discussions on various types of finishing—grinding, honing, lapping, diamond boring, superfinishing and measurements of surface finish.

Certain phases of grinding operations were covered by Ira Snader, chief engineer, Ex-Cell-O Corp., Detroit, who pointed out that two metalworking methods, grinding and precision boring, are used today almost entirely for correcting previous machining operations and heat treat distortions, and for establishing accurate size, dimension and form on the work.

Good Grinding Is Basic

Other methods of finishing are not so well adapted to removing a substantial amount of stock. To a great degree, other methods must depend on the ground or precision finished surface to obtain the required size and form such as roundness and straightness. Therefore, it appears certain grinding will not pass out of the picture as an obsolete operation.

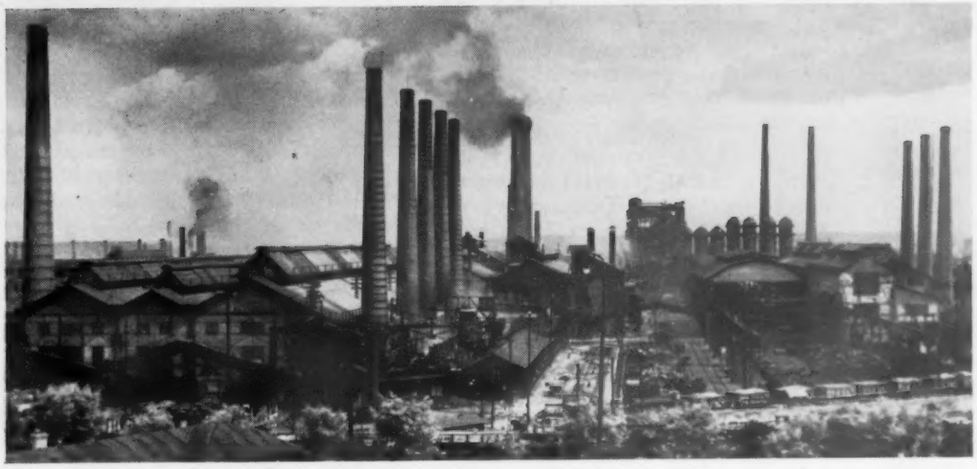
On the contrary, the further development of supplemental operations, such as honing, lapping and the latest metalworking development, superfinishing, will tend to develop a more comprehensive appreciation of a good ground surface as a basic requirement. The use of grinding machines will become more and more extensive with the development of these supplemental finishing methods.

The choice as to the method or methods to be used in finishing any particular part must depend upon the requirements of the finished surface, and the accuracy of dimension desired to provide for interchangeability of mating parts.

Especially important is the degree of smoothness as well as flatness required on the part. In recent years devices have been placed on the market for supplementing the microscope and the measuring micrometer for checking or measuring the surface finish. It is to be

(*Please turn to Page* 76)

■ **General view of main aisleway at Machine and Tool Progress exhibition in Detroit last week. Exhibitors numbered 253**



■ Prague Iron & Steelworks Co.'s plant at Kladno, Czechoslovakia, of which this is a recent photograph, has capacity for producing 500,000 tons of pig iron and a like tonnage of steel annually. For map showing location of Czech coal, iron fields, and steelworks, see STEEL, Oct. 31, 1938, p. 17

Reich Gains Substantial Iron, Steel and Finishing Capacity

■ GERMANY'S absorption of the remaining portion of Czechoslovakia further enhances the greater reich's position as an iron and steel producer. Gained in Hitler's latest coup were the Skoda works at Plzen, the nearby Prague Iron & Steelworks Co. at Kladno, and the Vitkovice Mines, Steel & Ironworks Corp., at Moraska Ostrava.

Germany also obtained some iron ore and coal reserves, timber, nonferrous metals, and, of great immediate importance, gold, estimated at more than $80,000,000.

The Skoda company has annual capacity of 150,000 tons, produces castings, forgings, structural steel, machinery, locomotives and guns. Employing 40,000, it is considered one of the most important steel plants in central Europe. The French Schneider interests ceded a controlling in the works to the Czechs early this year.

Hitler Claims Rich Prize

The Prague Iron & Steelworks has annual capacity of about 500,000 tons each of steel and pig iron. The Vitkovice Mines, Steel & Ironworks Corp. has capacity of 800,000 tons of steel and 750,000 tons pig iron.

Also gained were the Poldi steelworks, which makes special steels, the State Iron & Steelworks, which produces pig iron and steel, and numerous foundry and engineering works.

While mineral resources gained were generally considered slight, Hitler's official newspaper, *Voelkischer Beobachter,* claimed iron ore deposits near Beraun would yield 500,000 tons annually. Coal mines at Lkadno, it reported, would produce 2,000,000 tons, and at Dobnany, 2,000,000 to 3,000,000 tons, soft coal annually; at Maehrisch-Ostrau, 8,000,000 to 10,000,000 tons of hard coal annually. Lead, silver and gold deposits also were claimed. Copper and manganese, minerals needed by Germany, are not produced in the newly acquired territory.

Most important ultimate gain may be the large Czech labor reserve. However, a considerable time will be required to absorb the Czech laborers, despite the acute labor shortage in Germany.

United States exporters of iron and steel products will suffer little. Commerce department figures show this country exported only 237 tons of steel to Czechoslovakia in 1938, of a total 2,150,000 tons. Exports of power-driven metalworking machinery to Czechoslovakia were valued at $500,000, while such exports to all countries amounted to $97,000,000.

All trade considered, the loss will be substantial but not drastic. The commerce department reports trade between the United States and Czechoslovakia has dwindled from $114,000,000 in 1929 to $52,000,000 in 1938. Most of last year's $52,000,000 trade sources were eliminated last fall when Germany acquired the Sudetenland.

U. S. SHARE IN WORLD STEEL OUTPUT LOWEST IN 54 YEARS

United States' share of world steel production in 1938 dropped to the lowest point in 54 years, according to American Iron and Steel institute. Little more than one-fourth of the world's output of steel was produced here, as against two-fifths in 1937 and nearly half in 1929.

Estimated production of 28,250,000 gross tons of steel ingots and castings in this country last year was 27 per cent of the preliminary reported world total of 105,850,000 gross tons. In 1937 the United States produced 38 per cent of 133,160,000 gross tons, while in 1929 its output was 48 per cent of 118,370,000 tons.

In 1884 the United States made 26 per cent of the world's total, a proportion exceeded in every succeeding year.

Despite the severe reduction in its share last year, this country retained its rank as the world's leading steelmaking nation. For the first half of the year, however, Germany was in first place by a narrow margin.

Output in this country in 1938 exceeded that of Germany, which ranked in second place, by about 5,250,000 tons, which compares with a margin of almost 30,500,000 tons in 1937. Russia was the third largest producer in both years.

The combined steel output of Germany and Russia last year, 23,000,000 tons and 18,100,000 tons respectively, was nearly 40 per cent of the world total for the year, as against 28 per cent in 1937 and only 20 per cent in 1929.

Germany, Russia, Japan and Italy were the only major steelmaking nations to produce a greater tonnage in 1938 than in the preceding year. Production in Germany rose 14 per cent, as against increases of 3 per cent in both Russia and Japan, and 12 per cent in Italy.

Foundry Equipment Orders Up in February

■ February foundry equipment orders were higher than in January, according to the Foundry Equipment Manufacturers' association, Cleveland. Indexes based on 1922-24 show the following comparisons:

	Feb. 1939	Jan. 1939	Feb. 1938
Net orders	135.3	122.3	90.4
Shipments	112.2	96.3	80.9
Unfilled orders	175.1	151.4	157.1
3 mos. av. gross orders	133.3	118.0	94.0

FINANCIAL

ADDITIONAL REPORTS SHOW SHARPNESS OF 1938 DECLINE

■ IN ITS pamphlet report for 1938, Youngstown Sheet & Tube Co. shows a net loss of $658,934, compared with a net profit of $12,190,649 in 1937. Ingot operations averaged 38 per cent for the year; and 64.4 in 1937. Net sales declined 41.3 per cent to $84,664,566. Taxes accrued in 1938 were $3,685,000; in 1937, $6,019,000. Ratio of current assets to current liabilities on Dec. 31, was 9.17 to 1, against 4.28 to 1 on Dec. 31, 1937.

"Although the company's operations were higher during the last half of the year, the results of such operations were less satisfactory than the results of the first six months period," the report states.

"Certain governmental agencies had been exerting pressure upon a steel price situation already showing signs of instability, and during the latter part of June these conditions resulted in the establishment of a lower schedule of prices for steel products.

"The composite average of such basic price reductions for the several products made by the company (weighted according to the respective tonnages of the several products sold by the company, using 1937 sales for the purpose) was about 7½ per cent of the prices in effect immediately prior to such reductions . . .

"There now is greater stability in prices and indications are the volume of the company's business in the first half of 1939 will exceed that for the same period of 1938. However, the price level will be below that of the first half of 1938 without any compensating reductions in cost."

♦

Wheeling Steel Corp., Wheeling, W. Va., reports net profit of $493,138 for 1938. Its profit in 1937 was $4,238,488, equal to $4.08 a share on common stock. After allowing for preferred dividend requirements the 1938 figure represents a net loss of $2.55 per common share. Ingot operations averaged 52.6 per cent, against 75.9 in 1937. Net sales declined from $90,455,381 to $62,420,280.

♦

Empire Sheet & Tin Plate Co., Mansfield, O., had a net loss amounting to $423,978 in 1938, compared with a net profit of $243,415 in 1937. Average operating rate was 32.2 per cent; in 1937, 71.3. Net sales totaled $2,698,898, against $8,213,191.

♦

United Engineering & Foundry Co., Pittsburgh, reports 1938 net earnings were the second largest in its history, totaling $3,192,619, equal to $3.82 per common share. This was exceeded only by 1937 when net profit was $4,043,644, equal to $4.86 per share. Dividends of $2.50 per common share were paid in 1938.

♦

International Nickel Co. of Canada, Copper Cliff, Ont., shows net profit of $32,399,470 in 1938, after all charges. This equals $2.09 a common share and compares with the 1937 net profit of $50,299,623, or $3.31 a share. Robert C. Stanley, president, estimated expenditures for plant and other improvement in 1939 would amount to about $10,600,000.

♦

Directors of National Steel Corp., Pittsburgh, recently declared a dividend of 40 cents per share on its capital stock for the first quarter of 1939, payable March 31 to holders of record March 24. In the preceding quarter the dividend was 25 cents. Outstanding are 2,198,967 shares.

MEETINGS

FREIGHT SHIPPERS ARRANGE MEETING IN CLEVELAND

■ CALL has been issued for the forty-seventh regular and sixteenth annual meeting of the Great Lakes Regional Advisory board at Hotel Cleveland, Cleveland, March 22. Producers, receivers and shippers of freight, representatives of industry and railroads, and public are invited.

Commodity committees which will report include: Automobile; automobile parts and accessories; coal, coke and ore; industrial and agricultural machinery; iron and steel; nonferrous metal products; stoves, boilers and heating apparatus. Samuel B. Botsford, executive vice president, Buffalo chamber of commerce, Buffalo, will speak at the luncheon on "The Old St. Lawrence Project in the Light of Present Conditions."

CLEVELAND IS CHOSEN FOR OPEN-HEARTH CONFERENCE

Open-hearth committee of the American Institute of Mining and Metallurgical Engineers will conduct its twenty-second national open-hearth conference at Cleveland hotel, Cleveland, April 26-28. The program is now being arranged. L. F. Reinartz, manager, Middletown division, American Rolling Mill Co., Middletown, O., is chairman of the committee; and John T. Breunich, 29 West Thirty-ninth street, New York, is executive secretary.

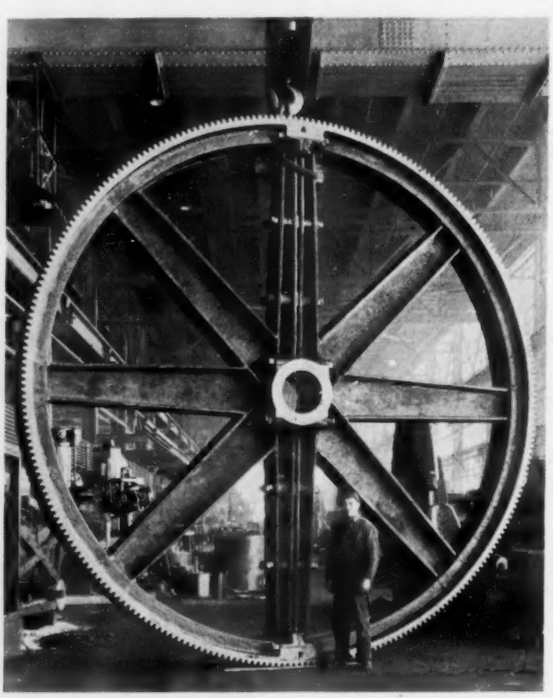
PROTEST CURTAILMENT IN WATERWAYS DEVELOPMENT

Thirty-fourth annual convention of the National Rivers and Harbors congress is to be held at the Mayflower hotel, Washington, March 23-24. Pointing out that the inland waterway system is a vital and integral part of national defense, the official call states that the entire national river and harbor program is imperiled by the sharp cut in the budget recommendation for the next fiscal year and impending legislation inimical to these activities. Securing of adequate appropriations for flood control is to be discussed.

◆

18-Foot Gear For Rolling Mill

■ More than 18 feet in outside diameter, this Farrel-Sykes continuous tooth herringbone gear is made from two steel castings weighing 44,900 pounds. The two halves are carefully machined and fastened with fitted bolts. Gear was made by Farrel-Birmingham Co. Inc., Buffalo, for driving a rolling mill



Tells Marketers Tide Has Turned

■ MOST powerful stimulant to business sentiment in a decade is the turning of public opinion against theoretical reform and toward sound recovery, E. L. Shaner, editor-in-chief, STEEL, told the Industrial Marketers of Detroit last Wednesday.

"After the trying days of 1932 and the near-panic in the first quarter of 1933, the man-in-the-street was ready to embrace anything new. This was the golden opportunity for the new administration, and it proceeded to pave the way for a new day."

Soon, however, it became apparent to industrialists that the administration was committed to extensive reform and that reform was to have the right of way over recovery, the speaker said. As the true intent of the administration was unfolded, it was greeted by industrial executives first with surprise, then with dismay, then shock and finally anger.

Public opinion from 1933 up to the middle of 1938 continued favorable to the New Deal and it was futile for industry to protest.

Man-in-Street Changes Mind

"However, the tide has turned," Mr. Shaner declared. "Congress knows it and the administration knows it. In recent months many of the mistaken policies of the past few years have been abandoned or modified. This is not because ardent New Dealers have changed their minds. It is because the man-in-the-street is beginning to change his mind. He wants more sound recovery and less theoretical reform, and he is going to get it.

"The significance of this change has not yet been fully appreciated by industrial executives. However, in that change lies a stimulant for business sentiment more powerful than anything that has happened in this country in a decade.

"Marketers of industrial products can well afford to adjust their activities to accord with this change in public opinion. The more extensively and intensively you can spread the word of the good points of your product today, the greater will be the harvest when the full force of changing public opinion begins to assert itself positively."

■ Niagara Hudson Power Corp.'s subsidiary companies will spend approximately $25,000,000 this year for "construction necessary to the extension and improvement of service to electric and gas customers" in New York state.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Mar. 18	Change	Same week 1938	Same week 1937
Pittsburgh ...	50	+ 2	30	91
Chicago	56.5	— 1.5	30	82.5
Eastern Pa...	40	None	29	58
Youngstown..	54	+ 2	27	85
Wheeling	73	— 1	38	97
Cleveland	54.5	+ 2.5	30.8	82
Buffalo	33.5	+ 1	28	87
Birmingham..	78	— 5	61	80
New England.	65	None	15	97
Cincinnati ...	55	+12	25	72
St. Louis.....	57.5	None	37	82
Detroit	76	None	33	100
Average....	56.5	None	32	89

PRODUCTION

■ STEELWORKS operations last week remained steady at 56.5 per cent, with small increases at five points and declines at three. A year ago the rate was 32 per cent; two years ago, 89 per cent.

Youngstown, O. — Advanced 2 points to 54 per cent, as Youngstown Sheet & Tube Co. resumed with three open hearths at Brier Hill. The same rate is scheduled for this week.

Cleveland — Increased 2.5 points to 54.5 per cent. Additional gains are in prospect at some plants.

Chicago — Off 1.5 points to 56.5 per cent after six weeks steady advance. Schedule for this week indicates gains by several producers.

Cincinnati — Up 12 points to 55 per cent after one week at 43 per cent, due to three open hearths being under repair.

Birmingham, Ala. — Down 5 points to 78 per cent, one open hearth being taken off by Republic Steel Corp., leaving 18 furnaces active.

St. Louis — Unchanged at 57.5 per cent, with 19 of 33 open hearths in production.

Pittsburgh — Gained 2 points to 50 per cent on resumption by Carnegie-Illinois Steel Corp. at Clairton, Pa.

Wheeling — Lost 1 point to 73 per cent as Wheeling Steel Corp. dropped two open hearths.

New England — Steady at 65 per cent with the same rate scheduled for this week.

Buffalo—Advanced 1 point to 33.5 per cent.

Central eastern seaboard — Continued at 40 per cent, this being the highest rate in more than a year.

Detroit — With production closely keyed to demand, the rate is steady at 76 per cent for the third consecutive week.

New Record Set By Light Steel

■ CONSUMER goods activity in fourth quarter, 1938, caused sharp increase in proportion of light steel products made for sale or shipped to consumers, American Iron and Steel institute reports.

Principal outlets are automobiles, refrigerators, kitchen ranges, farm equipment, sanitary cans and other stamped or formed articles.

Nearly half the rolled steel produced in fourth quarter was steel sheets, strip, tin plate, wire and other light steels, the largest proportion in any quarter during the past five years. In the first three quarters of 1938, only 45 per cent of shipments was light products.

Total production of finished rolled steel made for sale in fourth quarter, 1938, was 6,961,000 gross tons, about 20 per cent above the corresponding 1937 quarter. Output for sale in all 1938, 20,993,000 tons, was about 45 per cent below 1937.

Among industries which in 1938 took a larger share of steel than in 1937 were sheet and strip steel consumers, such as automobile, household refrigerator and range, agricultural and construction industries.

Railroads Take Less

Railroads took a smaller share in 1938 than in 1937, and the canning industry the same share in both years.

Sharp increase in demand for sheet steel during the final quarter last year was the principal factor in raising light steel proportion to the new high level. More than 1,812,000 tons of sheets were shipped during the period, 60 per cent more than in any preceding quarter of 1938 and half again as much as in the corresponding quarter of 1937.

Demand for wire and wire products likewise showed a marked increase during the final quarter. The total of 465,000 gross tons produced in last quarter, 1938, was one-fourth larger than the average in the three preceding quarters and also half again as large as in fourth quarter of 1937.

Mercury in Stainless Steel

■ An heroic figure of Mercury, "winged messenger of the gods" done in gleaming stainless steel, will tower above the entrance to the Ford exposition at the New York World's fair.

The statue, 25 feet high and weighing 3 tons, is formed of bent sheets, electrically welded.

MEN OF INDUSTRY

■ LEIGH B. BLOCK has been elected vice president in charge of purchases, Inland Steel Co., Chicago. He succeeds the late E. J. Block. Mr. Block began his career at the Indiana Harbor works of the company in 1924; three years later entered the purchasing department of that plant, and in 1928 became works purchasing agent. In 1932 he was transferred to the flat rolled steel division in the sales department at Chicago, and in 1934 was named assistant vice president and assistant manager of sales of that division.

♦

Sheldon V. Wood, president, Minneapolis Electric Steel Castings Co., Minneapolis, has been elected regent of the University of Minnesota.

♦

Blake S. Wright has been named branch sales manager of the warehouse recently opened by the Berger Manufacturing division of Republic Steel Corp., Canton, O., at 7485 Central avenue, Detroit.

♦

H. W. Graham, general metallurgist, Jones & Laughlin Steel Corp., Pittsburgh, has been elected chairman, executive committee, Industrial Research institute.

♦

I. J. Belanger, formerly with Belanger Fan & Oven Co., Detroit, has been appointed manager of the recently expanded sheet metal manufacturing division, Detroit Rex Products Co., Detroit.

♦

William J. Breckner, the past ten years associated with Morgan Engineering Co.'s engineering department, has joined the company's home office sales department at Alliance, O.

♦

C. N. Osborne, vice president, M. A. Hanna Co., Cleveland, has been named chairman of the committee on government finance, National Association of Manufacturers, New York.

♦

H. A. Bishop recently became associated with Youngstown Steel Tank Co., Youngstown, O., as a sales representative. He formerly was vice president in charge of sales, Petroleum Iron Works Co., Sharon, Pa.

♦

C. H. Butterfield has been appointed vice president and general sales manager of the industrial and railroad divisions, Manning, Maxwell & Moore Inc., Bridgeport, Conn. Formerly sales manager, locomotive equipment division, Mr. Butterfield, succeeds the late W. P. Bradbury. He started with the company in 1917 in the engineering department of the Hancock valve plant, Boston, subsequently becoming sales representative, railroad division, in the New England territory; assistant works manager and then sales manager, Hancock valve division. In 1934 he was made general sales manager, locomotive equipment division, which post he held until his present appointment.

Leigh B. Block

Blake S. Wright

C. H. Butterfield

Manning, Maxwell & Moore has also appointed Ralph F. Heath as sales representative in Houston, Tex., and Jack Schuyler to the New Orleans territory. Mr. Heath was formerly representative in New Orleans, and Mr. Schuyler, the past five years had been connected with the Los Angeles branch office.

♦

Benjamin Schwartz, Schiavone-Bonomo Corp., New York, has been named chairman, export committee, Institute of Scrap Iron and Steel Inc., New York. Harry Harris, Harry Harris & Co., Chicago, has been named vice chairman.

♦

R. B. Tripp, sales manager, Ohio Forge & Machine Corp., Cleveland, has been elected vice president, succeeding the late J. M. Clem. He will retain his position as sales manager. Other officers and directors of the company have been re-elected.

♦

Charles R. Wallander Jr. has been named eastern representative of Granite City Steel Co., Granite City, Ill., with headquarters in the company's new office, 7 Dey street, New York. He formerly was eastern representative for Follansbee Bros. Co., Pittsburgh.

♦

J. A. B. Lovett, manager, Hamilton Coke & Iron division, American Rolling Mill Co., Middletown, O., has resigned to become president, Milwaukee Coke & Gas Co., Milwaukee, effective April 1. He has been in charge of the Hamilton plant seven years.

♦

Jack Smith, formerly in charge of St. Louis district for United States Electrical Tool Co., Cincinnati, has been placed in charge of sales for the southeastern territory, with headquarters in Atlanta, Ga. Robert C. Upham, heretofore field service representative, is now in charge of the St. Louis branch office.

♦

Lewis H. Thomas has been named sales manager, tank division, Fruehauf Trailer Co., Detroit. Formerly manager of the Denver branch, Mr. Thomas has been succeeded by Earl Wright. D. E. Cowdery has been named manager of the Grand Rapids, Mich., branch of the company, replacing H. L. Mudge, who has been transferred to Cincinnati as branch manager. F. E. Boylan is now regional manager in charge of Sault Ste. Marie, Saginaw, Grand

Rapids and Jackson territories in Michigan.

♦

Marshall Adams has resigned as managing director, Producers' council, New York, to enter sales promotion and advertising work, with offices at 551 Fifth avenue, that city. Mr. Adams previously had been associated with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and American Radiator Co., New York.

♦

William L. Ditges, who has been appointed chief engineer, Morgan Engineering Co., Alliance, O., as recently reported in STEEL, has been identified with the steel industry in various capacities since graduation from college, having been employed in the engineering departments of the former Carnegie Steel Co., and Bethlehem Steel Co. In 1916 he joined the engineering staff of

W. L. Ditges

Mackintosh-Hemphill Co., advancing successively to posts of chief engineer and vice president in charge of design of rolling mills and auxiliary rolling mill machinery. The past four years he has been with Mesta Machine Co.

♦

Dr. C. E. A. Winslow, professor of public health and director of the Pierce Laboratory of Hygiene at Yale university, New Haven, Conn., has been elected technical advisor to the committee on research, American Society of Heating and Ventilating Engineers, New York. He succeeds Dr. A. C. Willard, president, University of Illinois.

♦

Paul F. Kavanagh has been named sales engineer, Gordon lubricators division, Blaw-Knox Co., Pittsburgh. Mr. Kavanagh, educated at Carnegie Institute of Technology, was formerly with Koppers Construction Co., Pittsburgh; Austin Co., Dallas, Tex.; Dwight P. Robinson Co., Los Angeles, and the past five

P. F. Kavanagh

years represented DeLaval sales and service, having been engaged in engineering, selling, and installing lubricating systems in England, Russia and in this country.

♦

J. C. Harger, former southwest district sales manager, Alemite division, Stewart-Warner Corp., Chicago, has been transferred to take charge of the southeastern sales territory. A. F. Haberl, heretofore manager, southeastern sales district, is now district sales manager of the east-central area, and Roy A. Sands has been named district sales manager for the southwest.

♦

W. C. Treadwell, for several years New England representative of Maas & Waldstein Co., Newark, N. J., maker of industrial finishes, is now representing the company in New York state, with headquarters at Rochester, N. Y.

Harlan M. Gale, formerly with Cleveland Varnish Co. and the Glidden Co., Cleveland, has been appointed sales representative in the New England territory for Maas & Waldstein.

♦

Marion A. Savage, designing engineer, General Electric Co., Schenectady, N. Y., has been awarded the 1938 Lamme medal of the American Institute of Electrical Engineers, New York, "for able and original work in the development and improvement of mechanical construction and the efficiency of large high speed turbine alternators."

♦

E. L. Bartholomew, associated with United Shoe Machinery Corp., Beverly, Mass., the past 23 years, ten years as open-hearth and mill superintendent of its subsidiary, Tremont Nail Co., has been appointed chief engineer. J. V. Baxter has been named superintendent of inspection. Prior to joining United Shoe Machinery eight years ago he was metallurgist with the Rhode Island Tool Co., Providence, R. I.

DIED:

JOHN F. REGAN JR., 55, superintendent of Youngstown Sheet & Tube Co.'s coke plant, Campbell works, March 6. He had been with the company about 30 years.

♦

Andrew C. Gilchrist, 50, factory superintendent, Una Welding Corp., Cleveland, March 7 in Cleveland.

♦

Milton D. Jones, 58, former structural engineer for Industrial Brownhoist Co., Bay City, Mich., March 5 in Cleveland.

♦

John Leigh Green, 65, president, Laclede-Christy Clay Products Co., maker of refractories, in St. Louis, March 5.

♦

John H. Teetor, 78, former president and one of the founders, Perfect Circle Piston Ring Co., Hagerstown, Ind., in that city, March 9.

♦

John Y. Blackwood, former chief engineer, Corrigan-McKinney Steel Co., now a part of Republic Steel Corp., Cleveland, in Northville, Mich., March 9.

♦

W. C. Speck, 52, superintendent of production, Buckeye Steel Castings Co., Columbus, O., in Columbus, March 5. A graduate of Purdue university, 1910, he worked for the Buckeye company as an apprentice, and was superintendent since 1929.

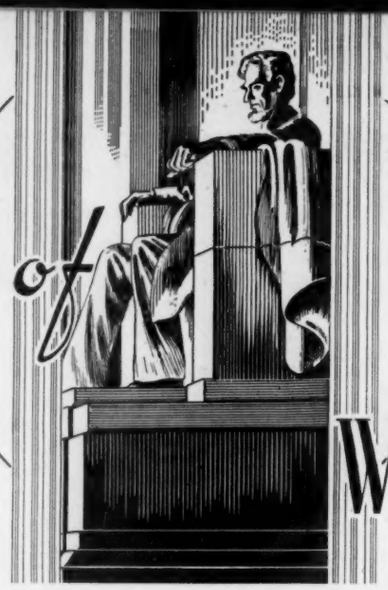
♦

Hugo Diemer, 69, March 3 in Chicago. He was director of management training, LaSalle Extension university since 1920, and was past chairman, Chicago section, Taylor society and American Society of Mechanical Engineers; past president, Chicago chapter, Society of Industrial Engineers, and was one of the founders and first chairman, Chicago Management council.

♦

Prof. Henry Louis, 83, prominent mining engineer and metallurgist, at his home in Newcastle-on-Tyne, London, Feb. 22. Early in his career he carried out experiments for Sir C. W. Siemens on open-hearth steelmaking. He was a past president, Iron and Steel institute, (British), Society of Chemical Industry; past vice president, Institution of Mining and Metallurgy, and for many years was secretary, North of England Institute of Mining and Mechanical Engineers.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ MR. ROOSEVELT and Secretary of Commerce Hopkins do not like the expression, "business appeasement." And "appeasement" does not look as rosy in Washington as it has for the past few weeks.

The administration wants to put any appeasement plan up to congress, while congress is shifting the problem back to the White House. Net result is that nothing constructive or definite has been done.

A bombshell was thrown last week into the camp of those who have believed the administration is going to help business when Speaker Bankhead announced there would be no tax changes. He did not mean, of course, the nuisance taxes would not be extended and that corporate taxes, which go out of existence on Dec. 31, would not be re-enacted. Apparently he saw no chance of helping industry in the tax situation.

The President stated definitely corporate taxes as a whole cannot be reduced. He admitted the tax situation "was in the study stage" and no recommendations will be forthcoming from the administration until after the results of the March 15 tax returns become available. In fact the President was not clear as to whether or not he would make any tax recommendations. He hinted such action could be initiated in the house without any recommendations from him.

The Chief Executive said that whatever is done regarding corporate taxes, the net amount received by the government cannot be lessened. He pointed out that 90 per cent of the taxes collected by the federal government come from percentage taxes. Government tax experts are making an intensive study of the tax situation to see if they can be shifted to lessen the burden on industry. The President said no study is being made regarding possible shifting of part of the corporate taxes to the income taxes and further he indicated the administration does not propose to shift the tax burden from large industry to small business.

Temporary national economic committee which continues its hearings on various industries has asked congress, through Chairman O'Mahoney for an additional $2,000,000. This committee was originally granted $500,000 for its investigations and that amount has been almost expended. Indications are the $2,000,000 will be granted.

CONFEREES AGREE TO KILL BARKLEY AMENDMENT

Conferees on the $358,000,000 army expansion bill reached an agreement last week to strike out the Barkley labor amendment which for several days held the bill in conference. Conferees also agreed to retain the provision for 6000 airplanes as passed by the senate compared with 5500 as passed by the house.

It is generally conceded the Barkley labor contracts amendment was drawn by the CIO, and industrialists who have been active against the amendment contended that it sounded a hollow note to the talk of business appeasement. It also was argued the amendment constituted a major hazard in the national defense program.

In addition to the Barkley amendment, there was a second amendment in the army expansion bill which limited profits to 10 per cent with a two-year recapture clause enabling the contractor to make up one year's losses in the next year. This was liberalized and a provision made for a 12 per cent profit with a 5-year spread.

National Association of Manufacturers contended the Barkley amendment would prohibit any government agency from awarding a contract for national defense materials or supplies to any employer found by the head of the contracting agency to be interfering with the rights of his employes. "As a practical matter, however," said the association, "it would prevent award of any contract to any person charged by the national labor relations board or by a labor union with violating the national labor relations act. The practical result would be denial of contract, not upon proof, but upon suspicion."

WALSH-HEALEY WAGE CASE APPEALED BY PRODUCERS

Counsel for seven small eastern steel producers last Friday filed a petition in the District of Columbia court of appeals for temporary injunction pending hearing and decision on appeal from the district court's decision dismissing their complaint.

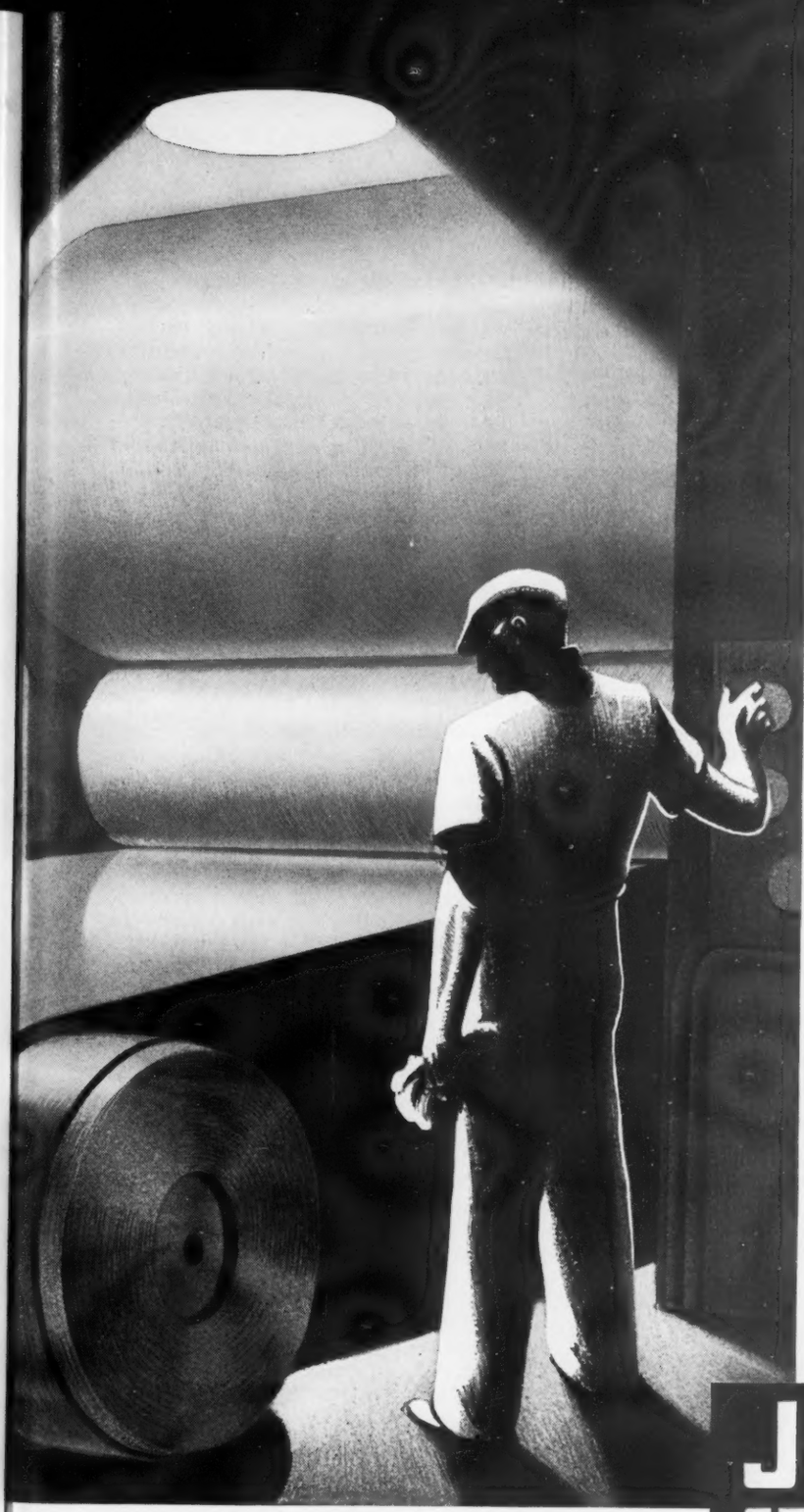
The government is expected to file an answer immediately and a decision on the injunction this week is probable.

The small steel companies lost the first round in the court battle to prevent the labor department from putting into effect the minimum wages when Justice Jennings Bailey of federal district court sustained a government motion to dismiss the case.

Judge Bailey held the steel firms failed to show that the secretary of labor's determination of the minimum wage rates prevailing in the steel industry was so "arbitrary and capricious" as to warrant the interference of the court. Counsel for the steel companies then appealed the case to the circuit court of appeals.

Secretary Perkins' prevailing rate determination went into effect on March 1, but seven of the smaller eastern steel manufacturers brought suit in an effort to have the wage order sent back to the labor department for further hearing. An injunction was granted by Judge Bailey to three of the seven companies; the government moved to dismiss the case.

The independent eastern companies so far have taken no action



J & L—your partner in efficiency and economy

The Jones & Laughlin business of making finer carbon steels for new and better uses is an enterprise in which every customer benefits by our skill, experience and research — enjoys the facilities of our new, highly specialized production.

Our 96-inch Continuous Strip and Sheet Mill was built for the purpose of broadening our usefulness to the metal-working industries, so that more and more manufacturers could turn out better looking, safer, longer lasting parts and products.

And manufacturers of all kinds of things — from automobile bodies to electric toasters — are coming to J & L in increasing numbers for the quality of strip and sheet we are now producing.

They come because they want to cut production costs and improve their products.

They come because they want steel that is uniform in quality and to gage — that has the *right* finish, the *right* drawing properties and the necessary forming characteristics.

They come because they know that at every step and stage *their* steel is checked and tested by our skilled steel-makers and trained metallurgists.

We invite you to make Jones & Laughlin your partner in production. Many companies — in many industries — have benefited by this close cooperation. Perhaps we can help you — to our mutual advantage.

J&L STEEL

STRIP

Hot and Cold Rolled, *in Coils or Cut Lengths*

SHEETS

Hot Rolled • Hot Rolled Pickled • Cold Rolled
in Coils or Cut Lengths

Flat Galvanized • Galvanized Roofing and Siding

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

MAKERS OF HIGH QUALITY IRON AND STEEL PRODUCTS SINCE 1850

J & L—ALWAYS MAKING FINER CARBON STEELS FOR NEW AND BETTER USES

toward advancing the base wage rate to 62½ cents an hour, pending clarification of the case. Present base wages generally are 56½ cents.

Meanwhile these companies are not quoting on government business involving over $10,000. No large orders are immediately impending.

CANCELS HEARINGS ON LABOR ACT REVISION

Senator Thomas of Utah, chairman, senate committee on education and labor, has canceled hearings on amendments to revise the Wagner labor act.

Howard Coonley, president National Association of Manufacturers, is urging Senator Thomas to call the hearings at the earliest convenient date. In a letter to the senator, Coonley, emphasized polls of public opinion have disclosed "the overwhelming majority of the people of the country" desire amendment of the act and unless early hearings are held there is little likelihood of action in this session of congress.

"We continue to firmly believe," Mr. Coonley said, "that the public stake of economic recovery from the interest of consumers, employes, and employers alike demands hearings on the question of possible amendment of the Wagner act."

RIFT APPEARS IN TNEC MONOPOLY INVESTIGATION

Difference of opinion has arisen between federal trade commission experts and department of justice officials on the way in which commission experts are handling cases before the temporary national economic committee.

Not only is there dissension between commission and justice experts, but the members of the committee itself are not as one on the way in which the hearings are being handled. It is known some committee members feel inasmuch as the administration is trying to "soft-pedal" actions against industry the committee is not helping the situation.

RAILROADS SHOULD SPEND $716,000,000 IN THREE YEARS

American railroads should spend $716,000,000 in the next three years for improvements and to make up deferred maintenance, according to a survey just completed by the interstate commerce commission.

Commission's figures are based on questionnaires to 115 roads, and show that at the close of 1938 deferred maintenance on railroad properties amounted to $283,000,000. Survey also indicates about $495,000,000 should be spent by the roads during the next three years for additions, betterments and extensions to enable the carriers to handle traffic more efficiently and cheaply.

Capital expenditures for equipment and other improvements to railway property in 1938 totaled $226,937,000 according to the Association of American Railroads. This was a decrease of $282,856,000 from 1937 expenditures, and a decrease of $72,054,000 from those in 1936.

Decline in capital expenditures in 1938 compared with the preceding year marked not only a decrease in purchases of locomotives, freight and passenger cars, and other equipment, but also a decrease in expenditures for heavier rail, additional ballast and other improvements.

Of the total capital expenditures in 1938, $115,408,000 was for locomotives, freight and passenger train cars, and other equipment and $111,529,000 was for roadway and structures. Capital expenditures in 1938 for equipment were $207,469,000 lower than in 1937, and $43,696,000 lower than in 1936. For roadway and structures, capital expenditures in 1938 were a decrease of $75,387,000 compared with 1937 and a decrease of $28,358,000 from 1936.

Expenditures for locomotives in 1938 totaled $39,570,000, compared with $59,738,000 in the preceding year. For freight cars, $52,814,000 was expended, compared with $212,902,000 in 1937, while for passenger cars, $18,149,000 was expended, compared with $41,491,000 in the previous year. For other equipment, the railroads in 1938 expended $4,875,000 which was about half of the amount spent for such purposes in 1937.

Among capital expenditures for roadway and structures made in 1938 was $17,247,000 for heavier rail, compared with $29,149,000 in the preceding year. The railroads also spent $18,231,000 for bridges, trestles and culverts in 1938, which was approximately $1,300,000 less than was spent in the preceding year, and $7,569,000 for yards and sidings.

MUNITIONS BOARD DISCUSSES TIN PLATE SCRAP EXPORTS

National munitions control board has made public its annual report for the year ended Nov. 30. Contained in the report is a discussion of the tin plate scrap export situation.

Report states that during 1937 the estimated tin plate scrap production in the United States was 251,101 tons while imports totaled 12,916 tons. The total quantities available in the United States in 1937 were 264,017 tons and exports totaled 14,126 tons. Quantities of tin plate scrap received by domestic detinning companies in 1937 totaled 249,891 tons while 95 per cent of total quantities available in the United States was received by the domestic detinning companies.

The board says it has continued its efforts to establish a complete list of all producers of tin plate scrap in the United States; it has received reports from 265 companies operating 406 factories at which tin plate scrap is produced.

During the latter part of 1937 and continuing in 1938, the report says the domestic detinning companies expended large sums in renovating and remodeling their plants. The necessity for these expenditures was due primarily to decline in the demand for tin tetrachloride, which is produced by the so-called chlorine process of detinning tin plate scrap. Because of this, considerable portions of detinning facilities were converted and new equipment installed for the production of sodium stannate by the caustic process of detinning. The board says the domestic detinning companies have continued to produce from both processes metallic tin in pig form.

To Assure Continuous Supply

Regarding popular misconceptions of the 1936 act the board says: "An impression has gained wide currency that its object was, in the interest of the national defense, to retain tin and tin-bearing materials in the United States. This, of course, is not the case. The sole contribution which the act makes to the national defense is that it assures to the detinning industry a continuous supply of the particular raw material, tin plate scrap, with which that industry deals, in order that the industry may be kept in a healthy state and be available as a domestic source of tin in a time of national emergency."

GOVERNMENT IRON, STEEL AWARDS TOTAL $546,203

During the week ended March 11, the government purchased $546,202.54 worth of iron, steel and their products under the Walsh-Healey act as follows: Byrne Doors Inc., Detroit, $38,907; Himelblau, Byfield & Co., Chicago, $11,035.07; Consolidated Steel Corp. Ltd., Los Angeles, $18,155; Northwest Steel Rolling Mills Inc., Seattle, $11,512.38; Tennessee Coal Iron & Railroad Co., Denver, $162,702.08; Pacific States Steel Corp., San Francisco, $18,035.83; Judson Steel Corp., Oakland, Calif., $15,556.30; Lukens Steel Co., Coatesville, Pa.; $11,070.49; Jones & Laughlin Steel Corp., Pittsburgh, $36,800.73 (estimated); Carnegie-Illinois Steel Corp., Philadelphia, $11,262.12; Carnegie-Illinois Steel Corp., Washington $28,108.80 (estimated); Ross Galvanizing Works, Inc., Brooklyn, N. Y., $49,000 (estimated); Penn Galvanizing Co., Philadelphia, $56,300 (estimated); Manitowoc Shipbuilding Co., Manitowoc, Wis., $24,925; The Montague Co., San Francisco, $8,631.30 (estimated); Pettibone Mulliken Corp., Chicago, $17,051.80; Hygrade Iron Works Inc., Brooklyn, N. Y., $16,775; and Empire City Iron Works, Long Island City, N. Y., $28,374.

AVIATION

EXPORTS INCREASE; MORE FOREIGN ORDERS PLACED

■ EXPORTS of airplanes and parts in January were valued at $4,892,000, compared with $2,879,000 in the month last year, according to the bureau of foreign and domestic commerce. Since the beginning of 1939, foreign orders have amounted to nearly $60,000,000. Exports for the calendar year 1938 were valued at $68,000,000, a new record.

British air ministry last week cabled an order for "blind landing" equipment costing about $120,000 to the newly-formed Air Track Manufacturing division of F. L. Jacobs Co., Detroit. Material is for testing purposes.

The rapidly expanding Lockheed Aircraft Corp., Burbank, Calif., is taking bids on construction of a one-story, 120 x 150-foot airplane service building, to cost $45,000. Company has stepped up operations, working two eight-hour shifts.

Lockheed factory employment now exceeds 4200, as compared with 2000 a year ago. The firm has just delivered in Liverpool, England, the first ship built under British air ministry's $25,000,000 order for 300 reconnaisance bombers.

Sperry Gyroscope Co. Inc. has awarded contracts for constructing a $60,000 addition to its Brooklyn, N. Y., plant. Last week this firm received from the navy a $119,070 order for navigation instruments.

Other recent military bookings: For the navy, Wright Aeronautical Corp., Paterson, N. J., engines, $4,857,583; for the army, Hamilton Standard propeller division of United Aircraft Corp., East Hartford, Conn., 710 hydromatic propellers. This is the largest award for metal propellers in the air corps' history.

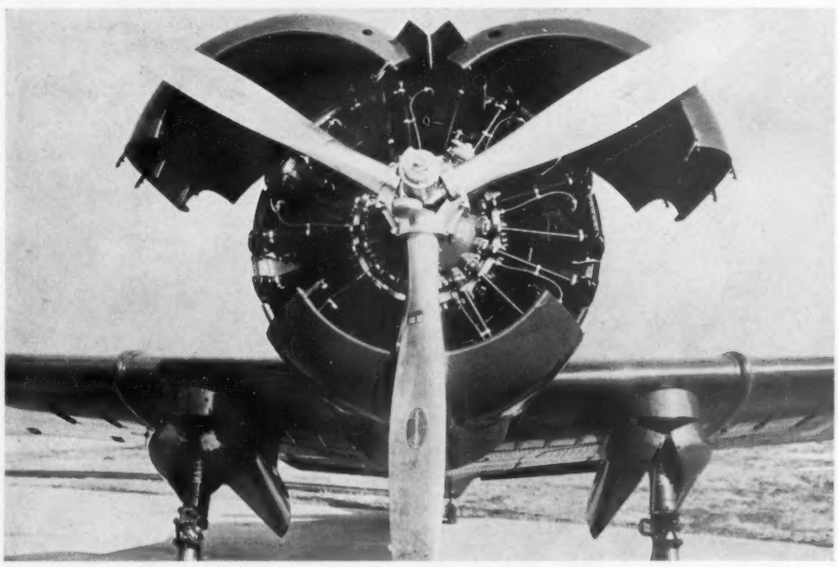
Orders for light plane engines have been booked by Lycoming engine division of Aviation Mfg. Corp., Williamsport, Pa., from: Aeronautical Corp. of America, Cincinnati, 100 units; Piper Aircraft Corp., Lock Haven, Pa., 100; Crowther Ltd., Lancaster, England, 50.

Senate and house conferees last week modified the $358,000,000 air corps expansion measure, dropping the CIO-sponsored labor amendment, and raising to 12 per cent the limit on manufacturers' contract profits. Losses may be averaged against profits over a five-year period.

Now under construction at Wright field, army aircraft procurement center in Dayton, O., is a $4,500,000 development and experimental laboratory, first step in the field's $12,000,000 enlargement program. Project will provide a new wind tunnel and test stands for 3000-horsepower engines.

General American Transportation Corp. entered the airplane manufacturing field recently by acquiring majority control of Barkley-Grow Aircraft Corp., Detroit.

"Interceptor" for Bombers Has New Type of Cowling



■ **Newest defense against bombing planes, this all-metal Curtiss-Wright "Interceptor" will exceed 300 miles per hour and climb 5000 feet per minute. It is armed with two synchronized machine guns. Hinged cowling of a new type permits ready access to the craft's 850-horsepower Wright Cyclone engine**

Activities of Steel Users, Makers

■ ALGOMA STEEL CORP., Sault Ste. Marie, Ont., has started its new tin plate mill on trial rolling of sheets. It is stated the final tinning process will be under way shortly. The new mill will supply 70 to 75 per cent of the tin plate requirements of Continental Can Co., in Canada on a five-year contract.

♦

Peninsular Steel Co. has opened an office and warehouse at 4532 West Palmer street, Chicago. N. B. McKeagan is resident manager.

♦

American Rolling Mill Co., Middletown, O., will consolidate its New York offices in the Equitable building, 120 Broadway. At present, its domestic offices are at 50 Church street, and export offices are at 21 West street.

♦

Williams & Co. Inc., Pittsburgh, has opened a new warehouse at 31 North Grant avenue, Columbus, O. Ralph Duff will be in charge, under supervision of W. P. Detweiler, manager, Cincinnati district.

♦

Stearns Magnetic Mfg. Co., Milwaukee, has arranged with Exolon Co., Blasdell, N. Y., whereby it will manufacture and sell the Exolon magnetic separator. As heretofore, the Exolon Co. will continue its former activities on the Exolon separator.

♦

McKenna Metals Co., Latrobe, Pa., maker of Kennametal tools and blanks for steel and metal cutting, has opened a branch office in Detroit in charge of Elwin M. Strickland, 142 Lothrop building.

♦

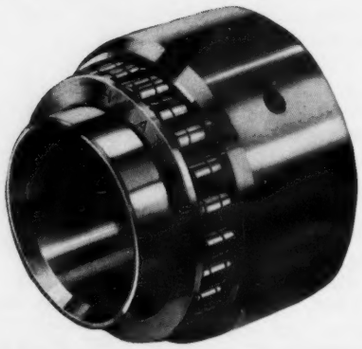
Sutton Engineering Co., Pittsburgh, builder of rolling mill equipment, with works at Bellefonte, Pa., has arranged with J. M. Hilbish and J. K. McCahan for manufacturing and selling their patented descaling equipment. The equipment in connection with the Sutton company's new roll sizing, straightening and polishing machine will be ready shortly for demonstration at the Bellefonte plant.

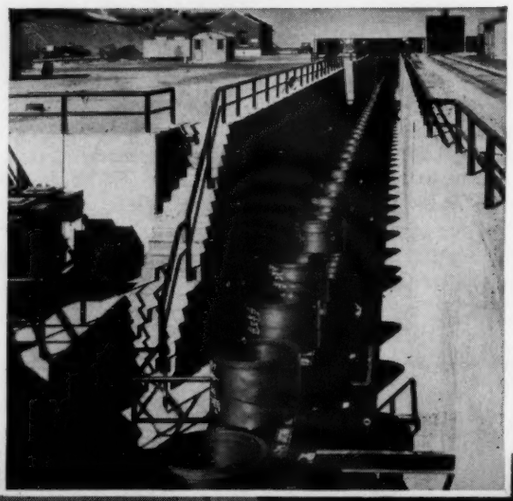
♦

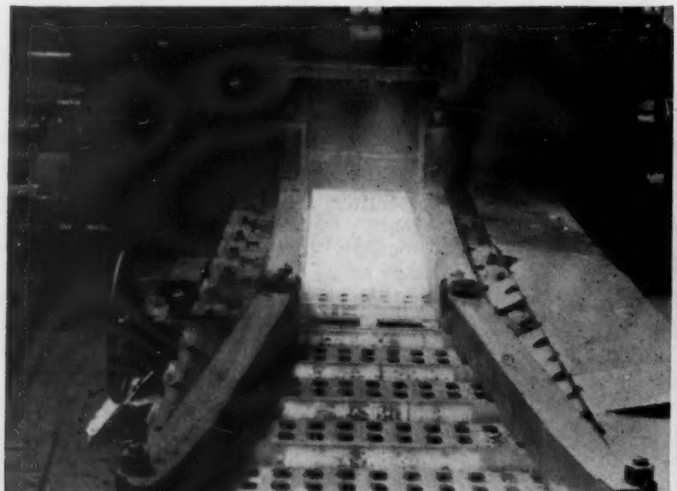
Kiekaefer Corp., Cedarburg, Wis., recently formed by Elmer C. Kiekhaefer, has taken over the assets, manufacturing facilities and complete line of the Cedarburg Mfg. Co. The new firm will manufacture Thor outboard motors, superchargers for internal combustion engines, magnetic-type landing gear brakes for airplanes, magnetic brakes, clutches, separators and specialties.

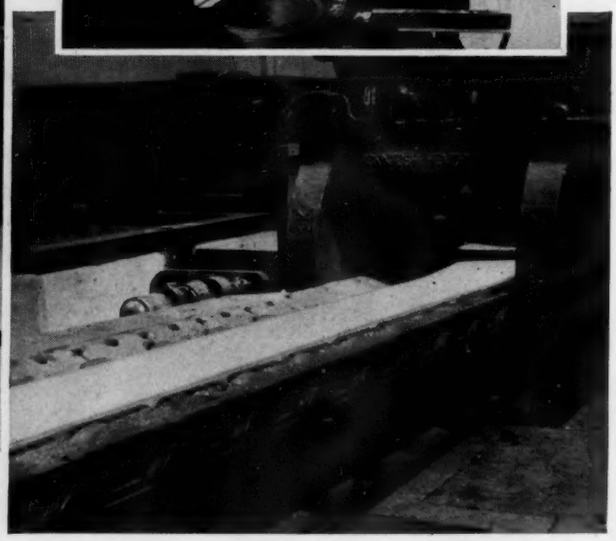
NO MATTER WHERE__
YOU'LL FIND HYATTS THERE!

The equipment you will see on the inspection trip to adjacent strip mills, during the A. I. S. E. Spring Meeting in Birmingham, is operating on thousands of Hyatt Roller Bearings. On tables, motors, cranes, ingot and charging cars; in the structural, merchant and plate mills of this important steel district, there are many more Hyatts. It's the same in all steel mill centers throughout the country... Hyatts are everywhere! Designed and built to withstand the strains of punishing loads and speeds, to save on power and maintenance, Hyatts are the preferred steel mill bearings. If you are contemplating new equipment or change-overs call on us. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., Chicago, Pittsburgh, Detroit and San Francisco.





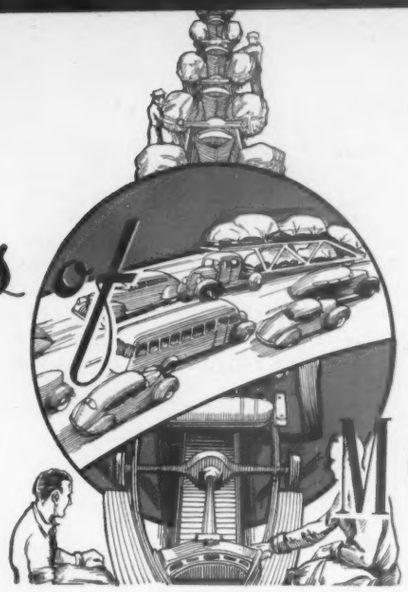




A few of the many Hyatt applications in Birmingham District are illustrated in the accompanying photographs

HYATT *Roller* BEARINGS

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ FROM early indications it appears Buick is going to be the spark plug of the 1940 General Motors lines. While, naturally, ambitious plans are being drawn up for all members of the corporation's family, the enthusiasm and drive now being evidenced at Flint suggests Buick will be the spearhead of GM's drive in the next model year. A program involving close to $18,000,000 is being shaped up for the six new Buick lines which probably will be identified as the 40, 50, 60, 70, 80 and 90 models, the 50 and 70 being two new additions now being groomed to set a new note in appearance and style.

Buick has been a star performer in the GM group for several years now (not forgetting Chevrolet's No. 1 position in the low-price field for seven of the last eight years) and lately has been holding fourth position in the passenger car field. First producer to return to five-day weekly schedule, Buick has been breaking sales records with almost monotonous regularity.

A continuation of this pace is presaged for next year, if the current pep at Flint is any indication. The new models have been designed to pull away sharply from the sameness which is evident in bodies of most GM lines this year. Buick is determined to set a new style distinctly its own, although of course Fisher will continue to supply the bodies and necessarily will have to preserve some interchangeability with bodies of other lines. But at least it will be subdued for Buick.

The two new models will break completely from conventional lines, and are being launched as more or less of an experiment to determine whether the public will "go" for this type of design. If so, they may be forerunners of styles for all models.

A hint of spending plans being shaped up by the corporation was dropped by Alfred P. Sloan Jr. in his message to stockholders wherein he pointed out that the nation's productive plant is largely obsolete, and that better instruments of production are needed to permit manufacture at lower cost. The only question mark in the picture is the "attitude of government as evidenced by its national economic policies, affecting as they do industry's opportunity to perform." However, in recent weeks this attitude seems to have turned gradually in the direction of recognizing industry's desire to be free of governmental harassment, and it may well be that we are on the verge of a tremendous spending program by industry.

Many around Detroit think so. They reason that industry knows full well the only road to progress and profits is through improvements in productive capacity, resulting in higher wages and a greater margin between wages and prices. But the millstone of governmental regulation, taxation, investigation and the like has weighed too heavily to make investments in productive equipment on a large scale profitable. The tide may be turning, and if so, look for some spending programs of almost astronomical proportions.

More than one plant, even among the properties of the "big three" producers, is in dire need of a thorough re-equipping and retooling, and in many cases the plans are ready for such refurbishing, awaiting

Electric Eye Aids Assembly

■ When a new Plymouth chassis coming down the assembly line reaches this station, the workman finds a radiator assembly of the proper color waiting beside him on this automatic feeder conveyor. A beam of light from the overhead box strikes the electric eye at the lower right and starts the line again when the part has been removed. Similar electric eye apparatus now assists workmen at more than a dozen points on assembly lines

only the propitious moment for release.

■ IT IS NOT likely the new Packard light six, mentioned frequently in these columns, will put in its appearance this year, if at all. The manufacturing program has been tabled, some equipment canceled and a number of engineers who were working on the model furloughed. Rearrangement of the Packard plant and equipment is progressing, nevertheless.

Explanations as to why the new model was abandoned as usual are numerous. One is that the manufacturing program was getting ahead of the plant layout and hence the former had to be suspended for the time being. Another is that the management considered current business conditions were not ripe for the introduction of such a car. Another is that extensive design changes, in both engine and car, have been occasioned because of miscalculations on cost. Another is that W. C. Durant recently persuaded the Packard management to give up a venture into the low-price field. Another is that Packard received a large order from the government and in the face of this business saw no reason to gamble on the success of a new model in an unfamiliar price field.

Plan New Motor Merger?

Elements of truth are probable in all these explanations. Mr. Durant recently did hold conferences with certain executives and what actually transpired is not known. However, he is reputed to be attempting to lay the groundwork for a fourth combination of motor car builders as the only solution for the so-called independents in competition with the three large companies. Whether Durant himself, or perhaps interests he represents, ever will achieve this move is problematical; but from many respects it appears to offer salvation for the independent manufacturers, despite the enormous difficulties to be encountered in knitting them together.

■ THIS WEEK marks the advent of spring, cheerful news to automobile companies and their suppliers. Already a start has been made on the normal upswing in production which develops at this time of year. From a low point of 75,660 units produced in the week ended Feb. 25 an advance has been made to near 90,000 last week, and the forward movement should continue over the next two months, although no abrupt increases are anticipated. A ceiling of around 115,000 units should be reached some week in May, to be followed by a declining rate in June and July, with changeovers in August and September.

January production of cars and trucks in U. S. and Canadian assembly plants totaled 353,946; February figures are not final as yet but will be about 315,000 units; and March assemblies will total some 370,000, yielding production of 1,039,000 for the first quarter of the year. Fourth quarter production of 1938 was 1,013,000, so that with half the model year elapsed 2,052,000 cars and trucks have been assembled. Figuring 65 per cent of the total output for a model year is produced in the first six months, then a grand total of 3,157,000 is indicated for 1939 models, comparing with 2,705,000 of the 1938 models, or an increase of 17 per cent.

Current production is running on an average 50 per cent better than at the same time last year, so this figure of 17 per cent may be a little low when the final additions are made this fall. In any event, the forecast made here some time back of a 22 per cent increase in production for 1939 models may prove to be surprisingly close.

■ NEXT Monday the anti-Martin wing of the automobile workers' union opens its convention in Cleveland and if no more action develops than at the recent conclave of Martin adherents here the split in the UAW will remain as wide as it is today. Since the recent outbreak of quarreling between the two factions at the Plymouth plant here comparative quiet has prevailed, but it is difficult to foresee any termination to the name-calling and hair-pulling proclivities.

While Homer Martin is the stronger in certain concentrated localities such as in Flint, nevertheless he must be conceded as controlling the weaker of the two groups, in number if not in spirit. How the picture might change if Martin should add the support of, say, 100,000 Ford workers to his ranks is something to speculate about.

Conciliatory services of the Toledo, O., industrial peace board were enlisted during 1938 in 74 labor disputes, affecting 12,363 employes and 45 of the disputes were settled without resort to strikes or loss of work. Six strikes affecting 367 employes were settled by the board. Eleven strikes, accounting for a loss of 40,498 man-days of work were calendared in the year, compared with 31 strikes and 90,819 man-days loss in 1937, and with 13 strikes and 227,868 man-days loss in 1936.

Local Board Proves Value

In his annual report the director of the peace board notes the development of the national labor relations board has not diminished the need for local means of adjusting disputes, since the national law excludes the matter of conciliation or mediation, requiring violation of the act or some interference with interstate commerce as a starting point. In many of the Toledo disputes, no public mention of the company or union involved ever was made, and thus settlements made privately without disturbing other plants or allied industries.

Production at Hudson plants has been increased 40 per cent in the last three weeks, several hundred employes recalled to jobs and the work week extended to 4½ days. Important gains in retail sales account for the step-up.

Eighty-two per cent of the 83,402 Buick 1939 models delivered at retail up to Feb. 20 were of the sedan type body—68.2 per cent 4-door and 13.8 per cent 2-door. Black carried the honors as far as color is concerned, with 40 per cent of the total, dark gray being next at 14 per cent, followed by dark blue and dark green, 10 per cent each, and light blue fifth.

Plans for early introduction of the Hupmobile Skylark models struck a snag last week and it appeared doubtful whether the company will be able to proceed with its plan to assemble several hundred of these 6-cylinder jobs in April, 1000 in May. Friction developed between the company and certain suppliers. Meanwhile Hupp is turning out a few of its senior line, working three days a week on the basis of about 20 per day.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	*315,000
March	519,022	238,598	.....
April	553,231	238,133	.....
May	540,377	210,183	.....
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Feb. 18	79,860	59,100
Feb. 25	75,660	56,977
March 4	78,705	54,440
March 11	84,095	57,438
March 18	86,725	57,555

†Comparable week.

	Week Ended	
	Mar. 18	Mar. 11
General Motors	36,515	36,165
Chrysler	20,570	16,200
Ford	17,950	20,425
All others	11,690	11,305

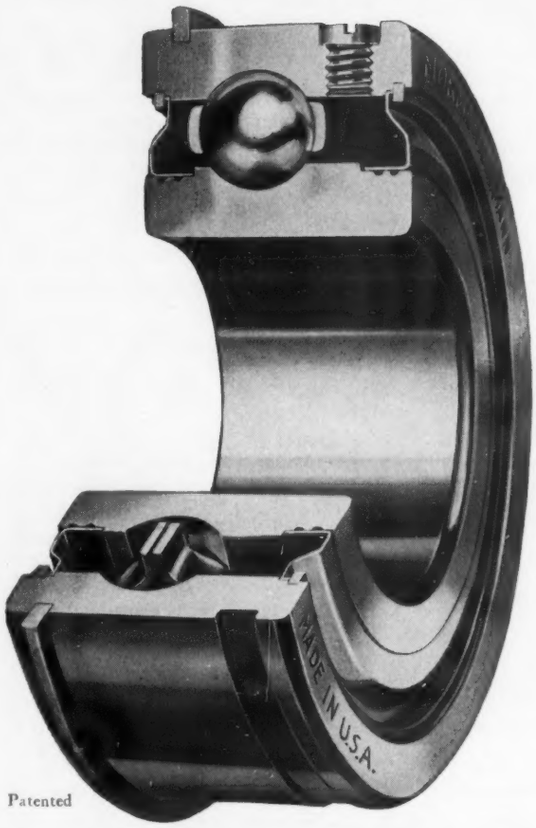
CARTRIDGE

SIMPLIFY YOUR DESIGN—DOUBLE YOUR GREASE CAPACITY—

ELIMINATE DIRT HAZARD

WITH THIS

Ideal Self-Sealed Bearing



Patented

MADE TO STANDARD DOUBLE-ROW WIDTHS WITH 100% GREATER GREASE CAPACITY

Available in Four Different Series

"3600".....with standard outer ring.
"43600".....with shoulder ring in outer ring.
"3600-J".....with refilling plug in outer ring.
"43600-J".....with shoulder ring and refilling plug in outer ring.

Can be packed with at least 100% more grease than any other self-sealed bearing—especially adapted, therefore, for continuous service for long periods.

Eliminates the dirt hazard and insures absolute retention of lubricant—by the use of flanged metal shields, recessed inner ring construction and two or more grease grooves, the combination affording a truly effective labyrinth.

Is equally efficient in retaining grease in horizontal or vertical position.

Flanged metal shields, though rigidly located by snap rings, are removable to facilitate inspection, cleaning or re-greasing of bearing.

Can be quickly regreased, either through built-in refilling plug opening or by removing metal shields.

Requires no lock nuts on shaft or clamping means in housing, because of wide contact areas due to double-row width of both rings—which also safeguard against "cocking" and prevent slippage or "peening".

Shortens over-all length of mounting and reduces overhang of shaft.

Reduces costs by simplifying design, eliminating protective closure parts, and saving attendant labor.

Available with shoulder ring, thus permitting a through bore in housing, the shoulder ring providing endwise location.

Placed on the market only after years of exacting tests in our laboratory and in the field under continuous operation, the "CARTRIDGE" BEARING has conclusively demonstrated its ECONOMY, EFFICIENCY and SUPERIORITY. A constantly increasing number of representative manufacturers of electric motors, machine tools, pumps, woodworking machinery, and other equipment is adopting it because of its proved merit. Write for Catalog showing typical "Cartridge" mountings.

NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN. U.S.A.

BEARING

Walsh-Healey Act, Steel Industry—As Interpreted by Contracts Board

■ NUMEROUS questions concerning the Walsh-Healey act and its applications have been asked since minimum wage rates, as fixed by the secretary of labor, went in effect March 1. For complete list of products, and wages, refer to STEEL, Jan. 23, p. 14-15.

For answers to the most urgent questions, STEEL applied to the public contracts board, which administers the act. The questions and answers:

Question—What is the procedure for exemptions?

Answer—Requests for the exception or exemption of a contract or class of contracts from the inclusion or application of one or more of those stipulations required by article 1 must be made by the head of a contracting agency or department and accompanied with a finding by him setting forth reasons why such inclusion or application will seriously impair the conduct of government business.

Must Justify Exemption

Request for the exception or exemption of a stipulation respecting minimum rates of pay and maximum hours of labor contained in an existing contract must be made jointly by the head of the contracting agency and the contractor and accompanied by a joint finding by them setting forth reasons why such exception or exemption is desired.

Decisions concerning exceptions or exemptions shall be in writing and approved by the secretary of labor or officer prescribed by him, originals being filed in the department of labor, and certified copies shall be transmitted to the department or agency originating the request, to the comptroller general, and to the procurement division of the treasury.

Question—Are construction contracts subject to the public contracts act?

Answer—No.

Question—What about erection or installation?

Answer—Contracts for erection or installation of materials and equipment may be either construction contracts or manufacturing contracts, depending largely upon the place where the work is performed. If most of the work is done at the site of the erection or installation, the contract is regarded a construction contract; however, if most of the work is done in a shop or factory away from the place of use, the contract is regarded a manufacturing contract. If there is any doubt, the matter should be referred to the department of labor.

Question—What is the amount of money involved in the contracts?

Answer—All contracts which may exceed $10,000 should include stipulations required by the act.

Question—What about contracts for less than $10,000?

Answer—When an invitation is issued for bids on a variety of items totaling $10,000, subject to the act, bidders permitted to bid on any one or more of the items amounting to less than $10,000 are exempt.

When a person bids on several items of equipment of an aggregate value in excess of $10,000 and is the low bidder on only a few items of an aggregate value below $10,000, his contract for those few items is not subject to the act.

Manufacturers, producing under a contract awarded to a regular dealer subject to the act and delivering directly to the government, are also subject to the act even though they are supplying goods amounting to less than $10,000.

Question—What about a subcontractor under the manufacturer?

Answer—If a contract is awarded to a manufacturer subject to the act and, in the normal course of business, the manufacturer purchases supplies or materials which are used in manufacturing the commodity required by the government, the work performed by the vendor of such supplies and materials and his employes is not subject to the act.

The one exception to this rule is that under section 1 (e) of the public contracts act the manufacturer agrees any part of the work performed under the contract will not be under working conditions which are insanitary or hazardous or dangerous to the health and safety of the employes.

Question—Who is considered a manufacturer?

Answer—A "manufacturer" is a person who owns, operates, or maintains a factory or establishment that produces on the premises the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications.

Defines "Employes"

Question—Who are considered employes under the act?

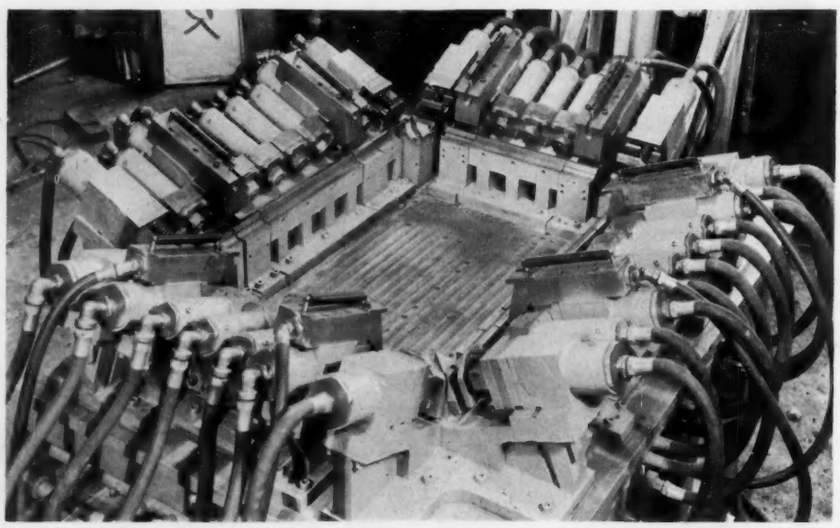
Answer—The following have been construed to be employes engaged in or connected with the government contract:

Apprentices and learners employed on government work.

If no separate records for employes engaged on government work are maintained, all employes in the plant are presumed, until proof is presented to the contrary, to be engaged on government work.

Technical workers, such as laboratory technicians and draftsmen, closely associated with the productive processes involved in the manufacture of goods or commodities re-

Punches Five Sizes of Refrigerator Panels



■ **Nash-Kelvinator uses this quickly-adjustable progressive hydraulic fixture to punch from 22 to 52 holes in five different sizes of refrigerator door panels. Average production is 200 door panels an hour in any size. Fixture was designed by Progressive Welder Co., Detroit**

quired by the government.

Office employes are those engaged exclusively in office work relating generally to the operation of the business and not engaged in the production of the materials, supplies, articles, or equipment required by the government contract.

Custodial employes are those whose duties are directed to the maintenance of the plant and equipment and who do not perform work on the commodities required by the government.

The following have been construed to be custodial employes: electricians, engineers, firemen, repair shop crews, watchmen, and maintenance men.

Construed not to be custodial employes: shipping crews.

Question—How about exempting manufacturers?

Answer—A reservation in a bid submitted by a dealer attempting to exempt a manufacturer who is to deliver directly to the government from compliance with the act or regulations would require the rejection of such a bid.

Question—How about items of less than $10,000?

Answer—When a bidder who specifically takes exception to the requirements of the act or regulations is the lowest bidder on some of the items advertised in an aggregate value below $10,000, the exceptions in the bids may properly be disregarded and no readvertisement is necessary, provided that the terms of the invitation permit bids for individual items to be received.

General Features Explained

Question—What about the general provisions of the act?

Answer—All persons employed by the contractor in the manufacture or furnishing of the materials, supplies, articles, or equipment used in the performance of the contract will be paid, without subsequent deduction or rebate on any account, not less than the minimum wages as determined by the secretary of labor to be the prevailing minimum wages for persons employed on similar work, or in the particular or similar industries or groups of industries currently operating in the locality in which the materials, supplies, articles, or equipment are to be manufactured or furnished under the contract. Provided, however, this stipulation with respect to minimum wages shall apply only to purchases or contracts relating to such industries as have been the subject matter of a determination by the secretary of labor.

Question—What about employes' overtime?

Answer—When an employe is engaged on government work subject to the act's provisions, he is entitled to time and a half for all overtime in excess of 8 hours in any one day or 40 hours in any one week, even though part of those periods be devoted to commercial work.

If an employe works Monday morning on a government contract, he is entitled to time and a half for all time in excess of 8 hours on that Monday or in excess of 8 hours on any of the six succeeding days, or in excess of 40 hours in the 7-day period commencing Monday morning, regardless of the kind of work performed during the remainder of that week.

If a payroll period runs from Monday through Sunday and an employe starts on government work subject to the act Wednesday morning, the employer may elect to follow his usual payroll week or to adopt a new week commencing Wednesday morning and ending Tuesday evening. In either event all time over 40 hours in the accepted work week must be considered overtime.

The fact that certain employes are paid on a weekly or monthly basis does not affect their right to overtime payment at one and one-half times their basic hourly rate.

Officers Elected by Road Builders' Manufacturers

■ Officers elected by the manufacturers' division, American Road Builders' association, meeting in San Francisco, March 7-10, include: Henry N. Schramm, president, Schramm Inc., West Chester, Pa., vice president and director; George F. Schlesinger, executive manager, National Paving Brick association, secretary-treasurer and a director. William M. Parrish, industrial sales executive, International Harvester Co., Chicago, was re-elected president as noted in the report of the meeting, STEEL, March 13, p. 26.

Directors elected: John Connors, president, Galion Iron Works, Galion, O.; Carl Wagner, vice president, Bucyrus-Erie Co., Milwaukee; John Kettlinger, president, Hercules Motor Corp., Canton, O.; Howard Hall, president, Iowa Mfg. Co., Cedar Rapids, Iowa; B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill.; Joseph Heil, president, Heil Co., Milwaukee; George Dimond, sales manager, Koehring Co., Milwaukee; R. W. Cornelison, vice president, Northwest Engineering Co., Chicago.

Directors re-elected: Paul F. Griffiths, vice president, Koppers Products Co., Pittsburgh; C. H. Lehman, general sales manager, Blaw-Knox Co., Pittsburgh; C. D. MacPherson, Gar Wood Industries Inc., Detroit; W. E. Miles, sales manager, Cleveland Tractor Co., Cleveland; Chauncey B. Smythe, vice president, Thew Shovel Co., Lorain, O.; J. M. Bauman, vice president, White Motor Co., Cleveland; E. J. Buttonheim, publisher, *American City;* J. F. Cast, manufacturers' sales manager, Firestone Tire & Rubber Co., Akron, O.; L. E. Dauer, Traction Machine Co., North Baltimore, O.; B. F. Divine, sales manager, construction and equipment division, Chain Belt Co., Milwaukee; A. F. Seranous, president, Associated Equipment Distributors; William P. McDonald, president, Wm. P. McDonald Construction Co.

February Machine Tool Index Gains 16.3 Points

■ Current strength in the machine tool market is indicated by an increase in orders in February, a seasonally low month. National Machine Tool Builders' association's index was 167.1, compared with 150.8 in January, 146.5 in December, 112.2 in November, and 90.3 in February, 1938.

Domestic orders gained ground once more over foreign orders; the latter held around the same level as for the last six months. This is regarded by the industry as encouraging to the immediate outlook at home.

Three months' average orders index rose to 154.8, against 136.5 in January, and 125.6 in December. The February three months' average approaches the 1929 average of 155.8.

Tacoma Bridge Third Longest Suspension Span

■ Toll bridge, connecting Tacoma, Wash., with Olympia peninsula and Puget Sound navy yard, to be completed in 1940, will be 6303 feet long, third longest suspension bridge in the world.

It will require 11,440 tons of structural steel, 2000 tons of reinforcing steel and 5000 tons of cables, castings and other specialties. Construction is underway by General Construction Co., Seattle, Pacific Bridge Co., San Francisco, and Columbia Construction Co., Bonneville, Oreg., joint bidders at $5,949,730.

Steel is being supplied by Bethlehem Steel Co., Bethlehem, Pa., and cable by John A. Roebling's Sons Co., Trenton, N. J. Washington bridge authority is in charge, funds being derived from federal aid and a bond issue.

Main piers will be in 120 to 150 feet of water at low tide, on 48 reinforced concrete anchor blocks, each 51½ feet long, 12 feet square. Steel pier caissons are anchored to these blocks by eyebolts and cables.

Editorial

Steel's Basing System—So What?

■ Last week's issue of STEEL set forth two unusually interesting stories.

One (p. 23) compared earnings of United States Steel Corp., representing 35 per cent of the steel industry, with those of General Motors Corp., representing 40 per cent of the automobile industry. During the past six years, it was shown, United States Steel paid only one dividend to common stockholders; this was $1 per share in 1937. General Motors declared a dividend in each of these years, from $1.25 on the low to $4.50 on the high side. Whereas United States Steel paid only $1 per share during the entire six years, General Motors paid a total of $14.75 during the period. And book value of steel common, on the basis of capitalization, is $151.09, which compares with $17.90 for General Motors.

The other story (p. 27) reported the details of the federal trade commission's blast against the steel price basing system at a hearing of the temporary national economic commission.

Government Interference Is Cause Of Dislocations in Price System

According to the commission, the steel industry "is a focal center of monopolistic infection which, if not eradicated, may well cause the death of free capitalistic industry in the United States."

"The wastes of cross-hauling and of excess capacity and high capital overhead are saddled on the consumer as if they were legitimate costs," claims the commission. "Under the guise of freight costs, buyers located at a distance from a basing point, even though they purchase from a mill in their own city, are charged what amounts to a penalty." The commission thinks the steel industry is "short-sighted" in carrying out the system "which is destroying the purchasing power of the people." It contends that this factor was "one of the things which helped to bring on the depression."

STEEL believes that the federal trade commission and other governmental bodies will do well to let the steel basing system alone. It has existed a great many years and came about naturally in the process of selling and buying steel. Consumers are accustomed to adjusting their competitive position under this system. It is only when, as last year, federal insistence brings changes in the basing system, that dislocations take place. Such changes help some consumers but injure others. They should not be encouraged by government. Experience indicates that it is best to let steel producers and consumers work out the steel price system in a natural way. Any unbiased observer knows that steel buyers are fully able to take care of their own interests in their dealings with steel producers, without help from government.

No Excess Steel Capacity Exists Under Normal Purchasing Power

It also is fallacious reasoning for the federal trade commission to hold that there is excess steel capacity. Rather, the trouble is that public purchasing power is insufficient to engage that capacity. Were the people of this country in a position to purchase what they desire, existing steelmaking capacity quickly would become entirely inadequate.

It is comforting to note Senator O'Mahoney's assurance that the federal trade commission's opinion was not that of the temporary national economic committee. It would be much better, however, if the federal trade commission would stop its nonsense about the economics of steel and address itself to the real problem—that of helping to stimulate industry, through the profit motive, so that it can offer gainful employment to every employable who is able and willing to work.

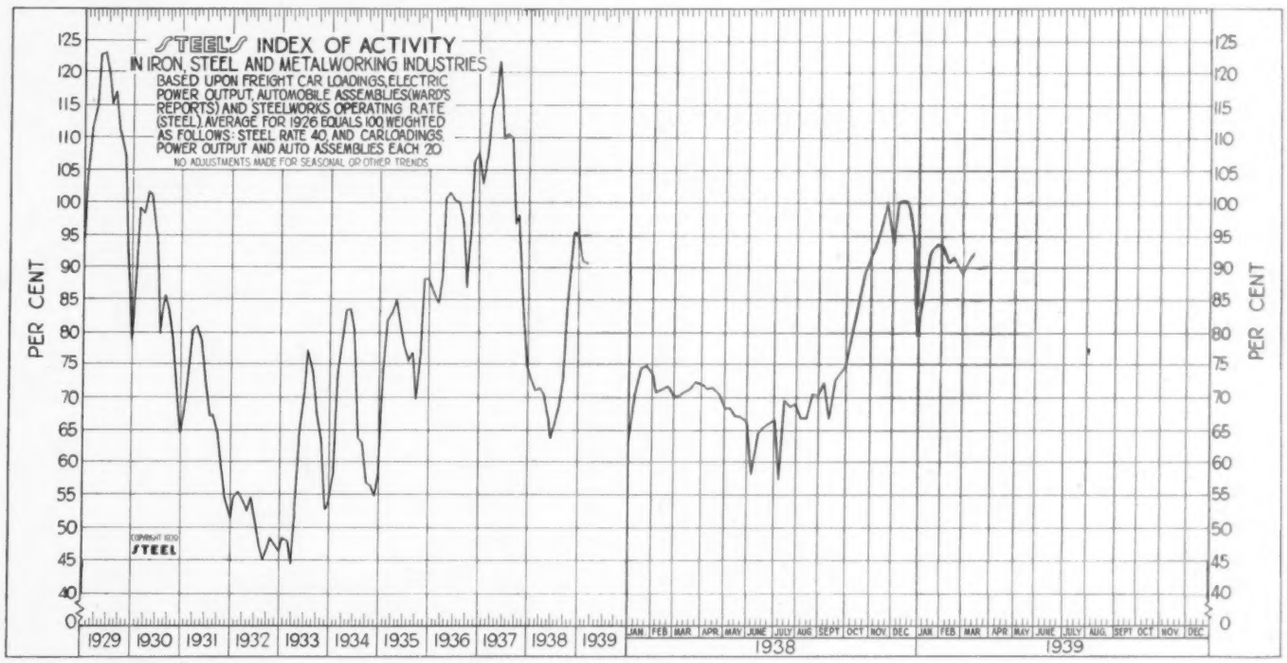
The BUSINESS TREND

Seasonal Factors Bolster Index of Activity

■ THE industrial consolidation period should culminate within the next few weeks. Stimulus from building construction, expected to increase demand for all types of materials, with an upward trend in automobile production and sales, forms a basis for the resumption of a business upturn in the second quarter. The fact that in most instances production has been closely geared with consumption in recent weeks adds weight to the belief that the expected seasonal improvement in the construction, automotive and other important industries should be directly reflected in a general upturn in business activity.

Gains in steelmaking operations and automobile production during the week ended March 11 more than offset the mild declines in revenue freight carloadings and electric power consumption. As a result STEEL'S index of activity advanced 1.2 points to 92.7. This compares with 70.8 in the comparable week last year, but remains well below the high point in the recovery movement last fall of 100.7 recorded in the week ended Dec. 10.

A sharp advance in automobile production of 5390 units to 84,095 in the week ended March 11 seems to indicate that this industry is now definitely experiencing the expected seasonal impetus. This represents the sec-


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939
STEEL

STEEL'S index of activity gained 1.2 points to 92.7 per cent in the week ended March 11:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Dec. 24	94.8	69.5	93.3	77.3	64.4	58.0	46.9	46.8	52.3	64.9
Dec. 31	79.9	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3
	1939	**1938**	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**	**1930**	**1929**
Jan. 7	86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8
Jan. 14	91.9	74.4	106.7	89.3	73.8	58.1	48.6	56.2	72.1	91.8	104.2
Jan. 21	93.0	74.7	104.0	86.0	78.1	60.9	49.8	55.8	72.9	96.3	107.5
Jan. 28	92.9	73.8	99.6	86.5	79.5	62.3	50.8	56.2	72.9	97.4	109.8
Feb. 4	90.7	70.9	100.8	83.8	81.8	66.9	49.9	56.0	74.9	100.8	111.3
Feb. 11	92.1	71.2	101.9	85.9	82.7	70.7	48.7	55.5	75.4	100.9	111.7
Feb. 18	91.1	71.9	108.8	81.8	82.8	72.4	48.3	54.5	76.0	97.7	112.6
Feb. 25	89.3	70.3	112.8	83.4	80.5	75.5	46.0	55.1	75.8	99.7	109.2
Mar. 4	91.5	70.1	117.9	87.7	81.1	76.8	47.4	54.1	79.2	98.3	113.5
Mar. 11	92.7	70.8	112.7	89.7	82.0	78.6	43.4	54.8	80.6	97.5	114.8

ond weekly increase from the low point this year of 75,660 units assembled in the week ended Feb. 25. On the basis of reports from 12 states, R. L. Polk & Co. estimate February registrations of new cars and trucks at slightly above 200,000 units, against 149,057 units a year ago.

Steelmaking operations recorded a slight increase in the week ended March 11 to 56.5 per cent. A year ago the national steel rate stood at 30 per cent. The expected seasonal improvement in this important industrial indicator of a more positive nature should develop early next month.

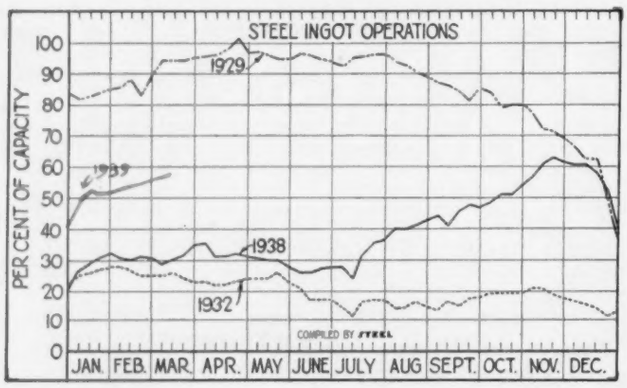
EXPORT BALANCE OFF SHARPLY

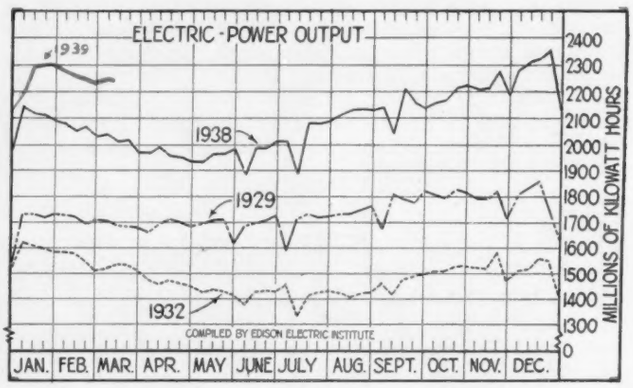
The margin of exports over imports of $34,707,000 in January was the smallest of any month since August, 1937, and compares with $97,450,000 in December and $118,374,000 in January, 1938. January shipments of $212,908,000 were 26 per cent below the January, 1938, volume and were 21 per cent less than the December, 1938, total. However, imports during January continued the improvement which started in the latter part of 1938. Imports in January were valued at $178,201,000, compared with $171,379,000 in December and $170,689,000 in January, 1938.

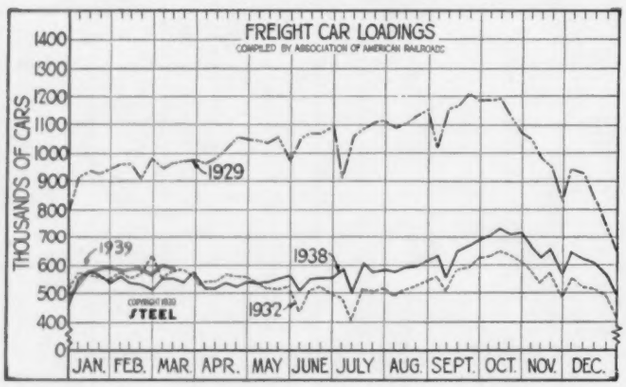
Following the general trend, exports of steel and iron products in January receded from the December volume. Excluding scrap, January exports totaled 134,788 gross tons with a valuation of $10,214,547. This represents a decline of approximately 19 per cent from the December exports of 166,404 tons, valued at $11,506,216. Scrap exports during January were also lower at 227,884 tons, valued at $3,351,351, compared with 323,691 tons, valued at $4,797,676 in December. Imports in January, excluding scrap, increased 9 per cent in volume over the December total to 24,331 gross tons valued at $1,729,145. However, scrap imports during January were lower at 3333 tons, compared with 6519 tons in December.

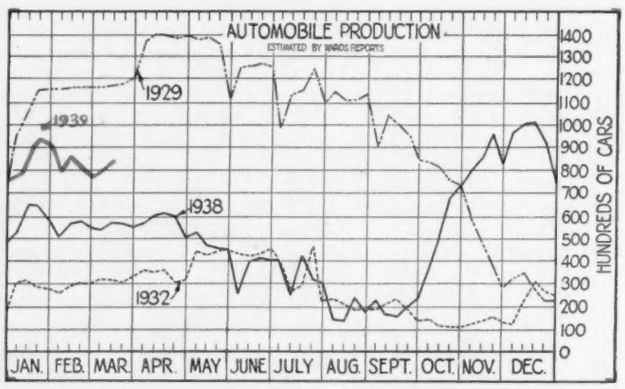
CAR AWARDS RECORD ENCOURAGING GAIN

Domestic freight car awards during February totaled 2259 cars, compared with only three in January and 109 in February, 1938. Excluding December when car awards totaled 2581, the February total was the largest since May, 1938. Class I railroads had 6637 freight cars on order Feb. 1, compared with 5080 Jan. 1 and 6563 Feb. 1, 1938. Steam locomotives on order Feb. 1 numbered 25, compared with 30 Jan. 1 and 110 Feb. 1, last year. Electric and diesel locomotives on order Feb. 1 were 59, compared with 41 Jan. 1 and 21 Feb. 1, 1938.



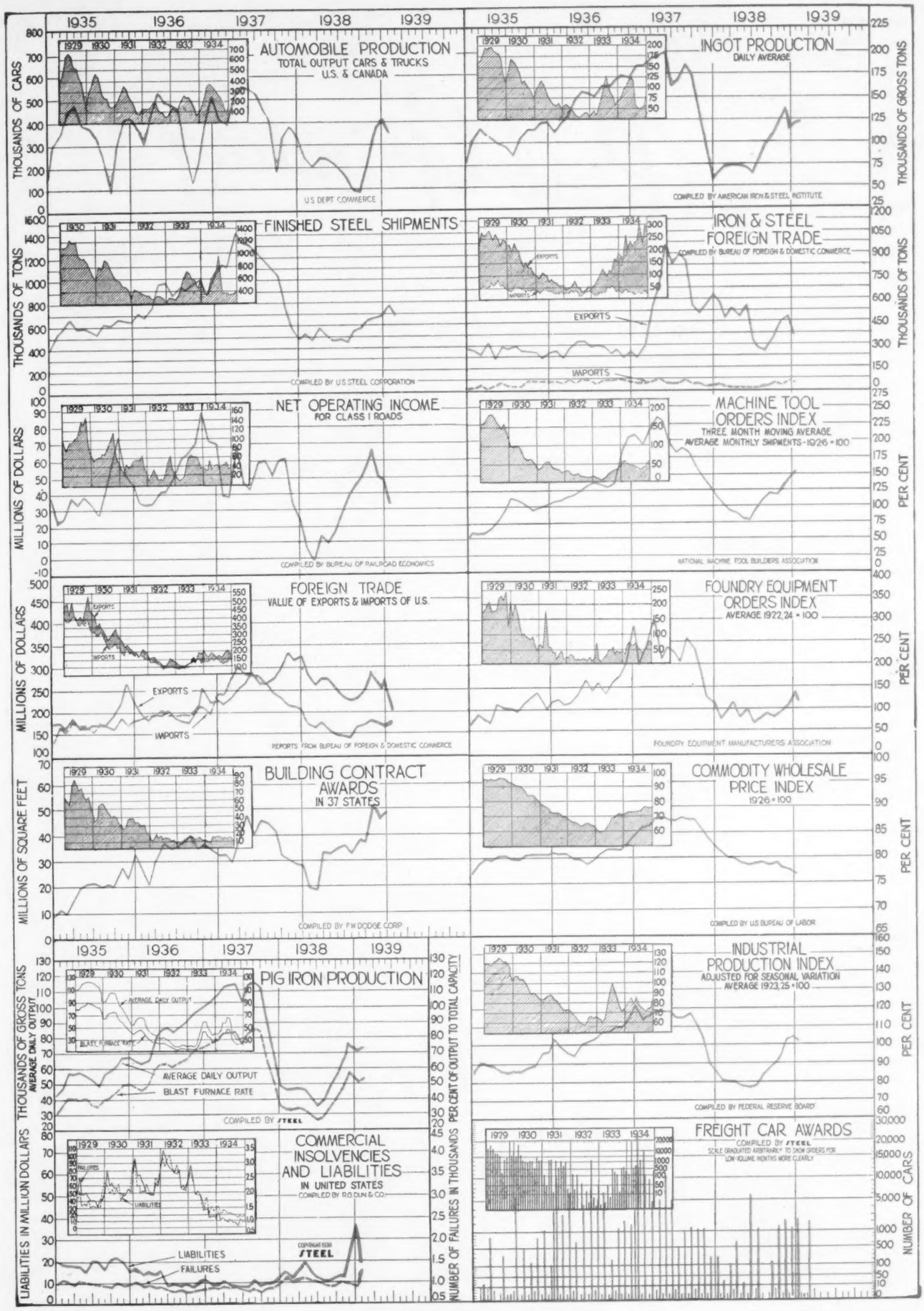






Week ending	Steelworks Operating Rate Per Cent 1938	1932	1929	Electric Power Output Million KWH 1938	1932	1929	Freight Car Loadings Thousands of Cars 1938	1932	1929	Weekly Auto Output 1938	1932	1929
Dec. 3	61.0	16.0	69.5	2,285	1,510	1,718	649	547	837	97,795	12,398	28,079
Dec. 10	61.0	15.0	67.0	2,318	1,519	1,806	619	521	937	100,705	21,695	31,255
Dec. 17	58.0	14.0	63.5	2,332	1,563	1,841	606	517	923	102,902	30,589	33,293
Dec. 24	52.0	12.0	63.5	2,362	1,554	1,860	574	495	843	92,890	27,396	23,216
Dec. 31	40.0	13.0	38.5	2,120	1,415	1,638	500	407	638	75,215	25,598	23,967

	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929
Jan. 7	51.5	26.0	25.0	84.0	2,169	2,139	1,619	1,542	531	552	573	799	76,685	54,084	30,755	75,000
Jan. 14	52.0	29.0	26.0	82 0	2,269	2,115	1,602	1,734	587	580	572	914	86,925	65,735	31,416	95,000
Jan. 21	51.5	30.5	27.0	83.0	2,289	2,108	1,598	1,737	590	570	562	932	90,205	65,418	29,365	105,000
Jan. 28	51.5	33.0	28.5	84.0	2,292	2,098	1,588	1,717	594	553	560	926	89,200	59,365	28,950	115,000
Feb. 4	53.0	31.0	28.5	85.0	2,287	2,082	1,588	1,728	577	564	575	947	79,410	51,443	27,110	116,000
Feb. 11	54.0	30.0	27.0	86.0	2,268	2,052	1,578	1,726	580	543	562	956	84,500	57,810	29,320	116,000
Feb. 18	55.0	31.0	25.0	88.0	2,249	2,059	1,545	1,718	580	536	572	958	79,860	59,100	30,410	116,500
Feb. 25	55.0	30.5	25.0	83.0	2,226	2,031	1,512	1,699	561	512	636	907	75,660	56,977	30,150	116,500
Mar. 4	56 0	29.5	25.0	89.5	2,244	2.036	1,519	1,707	599	553	560	977	78,705	54,440	31,390	116,500
Mar. 11	56.5	30.0	25.5	94.5	2,238	2,015	1,538	1,703	592	557	575	946	84,095	57,438	31,110	116,500


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS-1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
MILLIONS OF SQUARE FEET
THOUSANDS OF GROSS TONS
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
PER CENT
NUMBER OF CARS

Approved Roll Grinding Practice

In this, the last of Mr. Wills' articles on grinding of steel mill rolls, specific defects and their causes are examined in detail. Recommendations for various kinds of rolls are discussed and best practice for each type emphasized

By H. J. WILLS
Sales Engineer
The Carborundum Co.
Niagara Falls, N. Y.

■ ROLL GRINDING is not an exact science. While guideposts can be set up to lessen the chance of making expensive mistakes, successful roll grinding involves some experimenting and, above all, close attention to the multitude of factors which affect the ultimate finish and cost of the roll that is to be ground.

Because so many conditions affect the final result, it is not always easy to find the causes of imperfect grinding. For example, one roll grinding shop had trouble from chattering, apparently due to the use of too hard a wheel. But using a softer wheel did not correct the trouble. Careful examination revealed that the original wheel had been of the right grade. The chattering was actually the result of three interacting factors. The wheel spindle was loose; the wheel was being improperly dressed; and the wrong type of coolant was being used.

Two previous articles by Mr. Wills on other phases of roll-grinding practice were featured in the Feb. 13 and March 13, 1939, issues of STEEL.

In another case the complaint was scratching of the roll surface, ordinarily caused by dirty coolant, improper dressing, wrong bond or the like. However, examination showed that the roll surface was covered with microscopic holes caused by bubbles in the metal. These had not been apparent before because a wheel had been used which, because it was too hard, had floated the metal over the holes. With a softer wheel, the metal was cut clean and the holes came to light.

The principal troubles that arise in roll grinding and their causes are:

1—Hammering, chatter or bouncing. This may be caused by: a. Building up of glaze on the wheel face, or failure of the grain to penetrate the work. Most wheels glaze to some extent, but glazing can be minimized by careful wheel selection as to grade.

There is a tendency to select a hard wheel to get longer wheel life. However, this is usually not economical. For one thing, excessive dressing is required on finishing cuts to obtain a chatter-free face, a waste of usable and valuable abrasive. Also a too-hard wheel glazes

ROLL GRINDING SHEET #

Wheel Operating Data

Mill_____

Date_____ Machine No._____

Roll No.	Reduction in Roll Diameter (inches)	Operator	Time Consumed	Date	Trick

Total No. Rolls Ground_____

Total Reduction Work Size_____

Wheel Make_____

Wheel Size_____

Wheel Grinder_____

Fig. 1—Wheel operating sheets such as this are an aid to maintaining a complete history of a grinding wheel from its first job until it is discarded

quickly and chatters, gradually developing a hammering action which breaks away the glaze. Then the wheel settles down to another brief period of cutting until the glaze builds up again.

Because of this "self-clearing" action, a soft wheel will frequently last longer than a hard wheel since it will not usually glaze up and hammer so readily. However, the softer wheel must be handled differently. It must not, for instance, be fed in as hard as could a hard wheel. There is possible a considerable saving in power for while 150 amperes might be needed to keep a hard wheel cutting, a softer wheel may remove more metal with a consumption of only 75 to 100 amperes. Hammering also damages the wheel spindle.

Softness Causes Chatter

It is paradoxical that a wheel which is too soft also may cause chatter. This is because the individual grains of abrasive are loosely held in the bond and on contacting the roll, the grains pull out quickly. This leaves only the bond in contact with the roll surface, which causes chatter just as does glaze.

b. Too wide a wheel face for the grade, an out-of-balance wheel, or a wheel not true, or loose on mounting.

c. A poorly fitted wheel spindle with end play or spring, internal stresses from over-loading, or one not warmed up properly before grinding.

d. A spindle drive with whipping belts, uneven thickness of belt, splices, uneven speed or vibration of motor if integrally mounted.

e. Vibration in machine, building or foundation.

f. A roll drive with uneven gear action or pressure of driving pins, face plate out of true or driving pins not concentric with work ends.

g. A work mounting with poorly designed rests, poorly fitted centers, centers too loose or too tight, worn necks. Irregular chatter is sometimes caused by the roll being off the axial line of the head and tail stocks, due to adjustment *both* neck rests for parallel grinding. The best practice is to line up the roll by means of the tail stock neck rest *only*. Thus, if the roll is "low" at the end nearest the head stock, back out the opposite end instead of moving the "low" end forward.

h. Operation at too high a spindle speed, work speed too fast or too slow, faulty lubrication of neck rests or centers, dulled wheel.

2—Scratches or "fish tails" are another type of defect. These may result from: Dirt on work, in air, from dirty coolant or dirty wheel guards; gummy coolant or coolant of type that disintegrates bond;

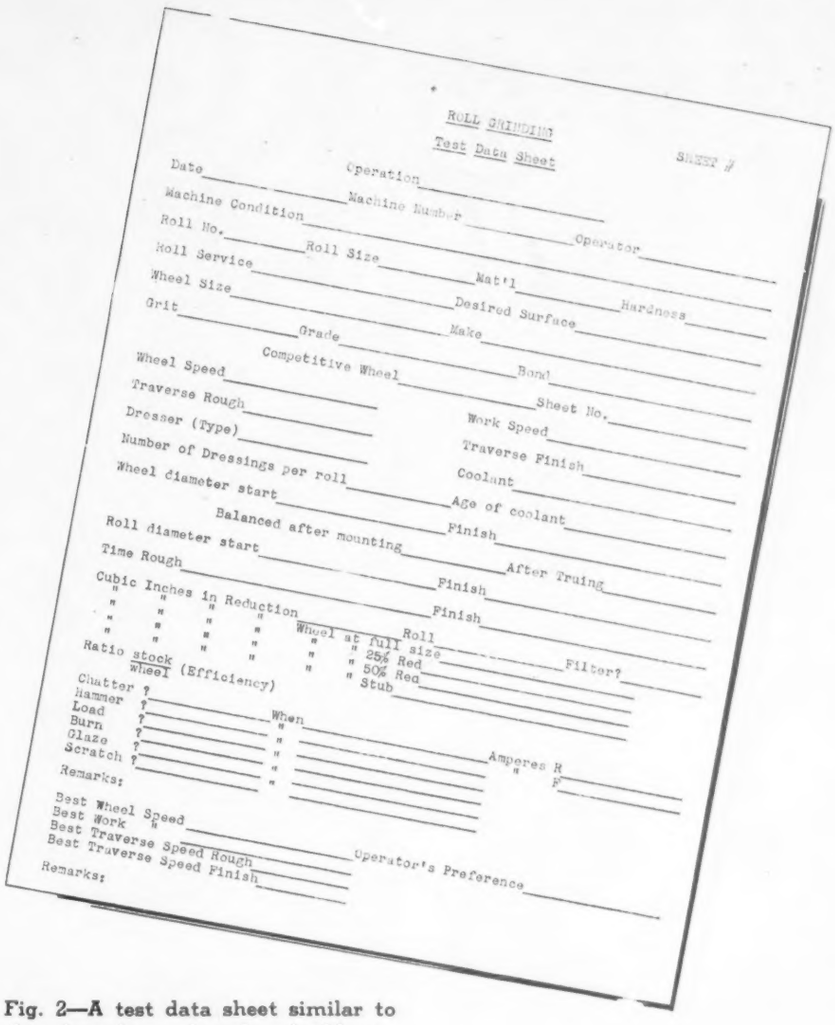


Fig. 2—A test data sheet similar to this has been found valuable in running comparative tests on grinding wheels

dressing with grains only partially removed by dull diamond, ragged wheel edges, failure to clean wheel and guards after dressing; hammering with scratches resulting from wheel grains loosened by hammering of wheel on work; improper bond.

3—Diamond marks on the roll may be due to: Diamond too sharp for type of wheel, cracked, broken, held at wrong angle either horizontally or vertically, lack of rigidity; traverse when dressing too fast, or at same rate and in same direction as when grinding; feed too deep when dressing.

4—Traverse marks on the other hand are caused by: Wheel too hard, corners not rounded off, dragging edge from faulty dressing, spring in spindle, feed too deep on finishing cuts, traverse too fast, hard wheel edges; work speed too slow; dressing off center line. Change traverse speed slightly at each traverse to break up patterns otherwise left on the work by the wheel.

5—Wheel marks in rough grinding are quite often caused by: Wheel with too open a structure, too coarse or too soft; too coarse a dressing; lack of finishing out with all wheels used.

6—Loading and glazing may appear when the wheel acts too hard, either because of grading or faulty manipulation; when the dressing tool is too dull, dressing is too fine, or wheel is dresed too infrequently; or when the coolant is too oily, gummy or dirty.

7—Out-of-round work may be due to such causes as roll supports with neck rests or centers not rigid or in good condition, necks out-of-round due to infrequent grinding; temperature changes caused by insufficient, varying supply, or wrong type of, coolant and warm or cold draughts of air on machine or work; a roll wabbling from poor drive.

8—Out-of-parallel work may be caused by a grinding machine with worn ways, improper setting of tailstock, centers not concentric with bodies; or by changes in work temperature from any cause.

9—Burning of roll surfaces during grinding may be due to wheel being too hard, feed too deep, wheel

brought to work too quickly, wheel allowed to pass too far off roll at ends, insufficient coolant, bringing wheel to work when work is dry, heavy feed or traverse lines, stalling of either work or wheel, chatter or hammering.

To get the best possible results at the lowest possible cost in roll grinding, it is essential to use great care in selecting wheels. It is customary to run tests to select a wheel best suited for a job. The test data sheet shown in Fig. 2 will be found useful for keeping a record of the information brought out by the test on each wheel.

It also pays to keep a continuing record of each wheel in actual operation. A wheel operating data sheet, such as Fig. 1, may be used to give a history of each wheel from its first grinding job until it is discarded. Note the column headed "Reduction in Roll Diameter, Inches." In many mills the life of a wheel is judged solely by the number of days or grinds it survives. A fair record should also show how much the roll diameter is reduced at each grind, roll size and hardness of roll. By recording the roll number as in Fig. 1, this data is available.

Rolls which must have an ultra finish should be ground on machines reserved for that work only. Such machines must be kept in the best possible operating condition.

However, only one grinder is available in many roll grinding shops. In such a case it is necessary to use all wheels for both roughing and finishing in their particular stage of the grinding. Thus the roughing wheel is finished out carefully to leave less work for the finishing wheel. Then the finishing wheel, in turn, is used both as a roughing and a finishing wheel. An exception to this is when difficulty is experienced in getting away from a gray background on a full finish roll, in which event the finishing wheel, generally the only one used, is not allowed to take what might be called a roughing cut. By holding the cutting cycle of such wheels to less than 0.0001-inch per pass, the grain of the roll surface will not be opened.

Now consider somewhat more specifically the requirements of the various rolls themselves with such factors as the material of which the rolls are made, nature of the surface they must transmit to the product, and so on.

The first roll in the hot strip mill —the scale breaker—is soft and does not require a particularly good finish. Work rolls in a 10-stand strip mill are progressively harder, those on the No. 10 stand, being the hardest, are made of hard nickel-chromium chilled iron. Best practice is to choose a wheel best suited to the hardest rolls and to manipulate the wheel to suit the softer ones. This can be done by speeding up the wheel within safe limits, slowing down the work speed, and reducing the rate of traverse. Wheel should have grit about No. 36, silicon carbide abrasive, resinoid bond.

Hot mill back-up rolls in all stands are usually of steel. Abrasive employed is aluminum oxide, 20 to 50 grit, resinoid bond.

Fig. 3—View of a typical roll-grinding operation. As evident here, the coolant used is almost transparent

Avoid Chatter Marks

Cold mill rolls are made either of hard nickel-chromium chilled iron or hardened steel. Sheets that later take a coating of enamel are given a matte surface so the enamel will adhere better. Rolls for such work are sandblasted so they produce the matte surface. However, sandblasting may bring out surface defects not apparent after grinding. Every effort must therefore be exerted to prevent traverse lines, fine chatter marks and the like in grinding. Great care must be used in selecting the wheels and in applying them to the work. They should be well on the soft side, resinoid bond, 80 to 180 grit, silicon carbide abrasive, which will be satisfactory on both the hard iron and the steel rolls if properly selected.

Wheel corners should be well rounded to prevent traverse lines, cutting must be free, and coolant carefully selected. On crowned rolls it is important that the grind be finished out at the top of the crown.

Rolls for skin or temper mills, used after cold rolling or annealing to restore the proper surface conditions to the product, are frequently given an ultra finish. Silicon carbide wheels of 320 to 500 grit are used to best advantage.

Tinning mill rolls present no particular problem except that, being quite slim in proportion to their length, they require several steady rests and a free-cutting wheel, usually of aluminum oxide, vitrified bond. Face of wheel should be not more than 2 inches wide since pressure against the roll must be kept at a minimum.

Rolls for small strip are, except for pinch rolls, all ultra finish. It is well to note that a finish which until recently would have been considered ultra, is no longer satisfactory as a rule as consumers now insist upon having strip material with so fine a surface that no further polishing is required. Therefore small strip rolls must have a surface comparable to that provided on jewelers' rolls.

Portable Paving Plant

Welding saves 40 per cent in cost of portable plant, permits making plant in three units instead of four with corresponding decrease in transportation costs. Entire plant built in eight weeks enabling contractor to obtain large job

By R. C. SHOEMAKER
Equipment Engineer
Warren Northwest Inc.
Portland, Ore.

■ CENTRAL mixing unit in the "hot mix" type of asphaltic concrete highway construction must dry and heat cold moist sand and crushed rock so it will mix properly with the cementing medium, asphalt. Sand and rock are carefully screened into separate bins, drawn into a weighing hopper in predetermined proportions and subsequently discharged into a pug mill mixer where a fixed quantity of asphalt is introduced. Trucks carry the resulting mixture to the road where it is spread in layers usually about 2 inches thick and compacted by rollers to make the pavement surface commonly known as asphalt.

Early asphalt plants were placed in more-or-less permanent locations for use in paving city streets. With adoption of the plant-mix type of pavement to state highway work, it frequently became necessary to move paving plants, sometimes to localities not served by a railroad. Highway restrictions with regard to weight, height, width and length limits have been tightened. To make matters more difficult, it has been necessary every year to produce plants of greater capacity to keep pace with developments in mixture spreading equipment and high speed trucks which are now available to deliver mixtures from the plant to the road. Thus the design becomes more difficult.

The plant, Fig. 1, is divided into three main units known as Unit A, Fig. 2, which includes the tower, bin and screen; Unit B, Fig. 3, with the mixer, scales, weight box, levers, etc.; and Unit C, Fig. 4, the drier. Additional equipment assembled for use with this plant includes dust piping, dust collector and dust elevator. No special requirements are imposed on the blowers, boiler, asphalt pump, tanks, general piping and power plants, so these latter units will be omitted from the following discussion.

Nearly all drive chains, line shafts and counter shafts found on other designs have been eliminated on the theory that they are both dangerous and expensive. Separate motors are used instead on minor drives and a diesel generator provides power where utility power is not available.

Items discussed here, designed and fabricated for this specific plant, are steel tower and large hopper of Unit A; mixer platform of Unit B; and the dryer complete with subframe of Unit C. All are completely welded.

The tower is made up of three sections. Top section slides down within the middle section and then both top and middle sections slide down inside the bottom section, all three sections nesting one within the other and the whole surrounding the bin when Unit A is ready to move on the road.

Lower columns are 5 x 5 x ½-inch angles and the top section columns are 4 x 4 x 5/16-inch angles. The horizontal cross members instead of being channels are made of 4 x 4-inch heavy H-sections with webs in the horizontal plane.

Diagonal bracing for side and end panels is provided by flat bars, since a thin section in a vertical plane offers the least possible obstruction when one section slides within another. Gusset plates to which these diagonals are welded are of good size to provide rigidity, but continuous welds along their edges were not required to develop their full strength. To eliminate all obstructions that might make erection difficult, gussets are butt welded to leg angles and diagonals are butt welded to the gussets. Attempting to achieve this result without arc welding would have been costly.

Tower complete, including outriggers and elevator tail shaft as-

This article is an abstract from the paper receiving the second award, $508.77, in the Industry Machinery, Construction classification of the $200 000 award program sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland.

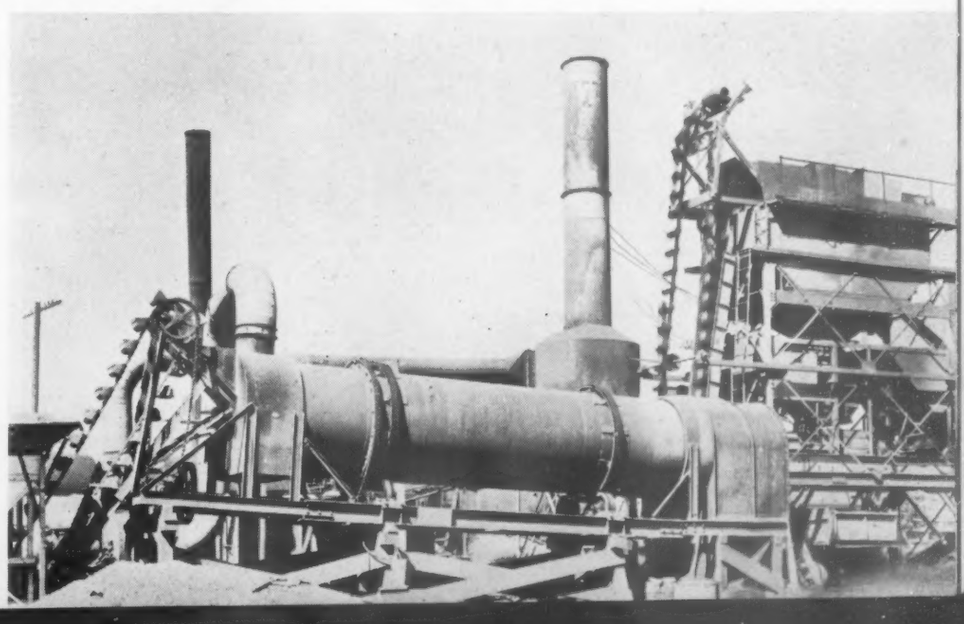


Fig. 1—Mobile paving plant set up and in operation

sembly weighs 6500 pounds. A comparable tower of conventional unwelded construction would weigh about 22 per cent more than this.

Large welded hopper at top of tower is made of 3/16-inch plate to save weight. It is strengthened where necessary by welded ribs. Weight of hopper and material in it is supported by two 10-inch channels bolted to wing plates, butt welded to the edge of the tower leg angles. Six ¾-inch bolts are required at each corner but no special design was necessary to develop equal strength in the weld between wing plates and tower legs.

Hopper is divided into four separate bins by partition plates. Upper 4 feet is hinged to the lower part to permit transporting the screen within the bin. During operation, the hinged upper portion is bolted to fins welded to the hopper side. A welded reinforcement gives added strength to these fins and prevents distortion of bin sides. Hopper is 7 feet wide, 15 feet long, and 8 feet 4 inches deep. Net weight is 6800 pounds.

Because of the heavy equipment supported by the mixer platform and the dynamic stresses induced in it by a 100-horsepower engine driving the mixer at slow speed with tremendous torque, particular attention was paid to design of beams, bracing and connections for this unit. Frame is 6 feet 4 inches wide and 23 feet 10 inches long. It is made on the same principal as a trailer with goose neck frame and is, in fact, a stable trailer when in transit. It was necessary to provide the customary joint about 5 feet back from the front end of the frame to give clearance for steerage to the front pony. Shear at point of intersection between yoke beam and main beam is nearly the maximum for the whole frame, so great care had to be exercised in designing this joint.

Main frame is composed of two, 15 inch, 50 pound channels, 18 feet 4 inches long. Front or yoke beams are 10 inch, 15.3 pound channels, 7½ feet long with ⅜ x 10-inch cover plates welded to the outstanding legs to form box sections. The 10-inch channels rest on top of the 15-inch channels and overlap for a distance of 2 feet. The two sections are welded all around with a ⅜-inch fillet. Also a heavy gusset plate is butt welded to the end of the 15-inch channel and double lap welded to the 10-inch channel. In addition a ½ x 4-inch strap was put on each side running from the top of the 10-inch channel to the bottom of the 15-inch channel. A full fillet weld was run on each side of each strap. This platform has been mounted on its wheels and run nearly 500 miles over all kinds of highways without a sign of failure. Mixer platform weighs 3450 pounds.

Dryer drum, 72 inches in diameter by 26 feet long, is made of 5/16-inch plate in four courses. Longitudinal and girth seams are butt joints, welded inside and out. This is cheaper than beveling and permits full penetration. Since shell must be absolutely straight and true in diameter, particular care was used in rolling each course to get a true cylinder. To get the shell straight throughout its entire length, a 30-foot railroad rail was blocked up at each end and the four courses hung on this rail.

After tacking each course to the next one at one point, all the courses were rotated 90 degrees and tacked again until the complete shell was tacked together at the four quarter points. This refers to the girth seams only. Longitudinal seam of each course was completely welded after rolling.

Drum Supported By Welded Tires

Drum is supported by two tires made from 2 x 6-inch steel bars. Extreme care was used in rolling the tires to get them true to diameter After rolling, tire ends were beveled to a 45 degree opening and welded full. The tires roll on heavy trunnions which have 1-inch thick welded steel tires shrunk on the rims.

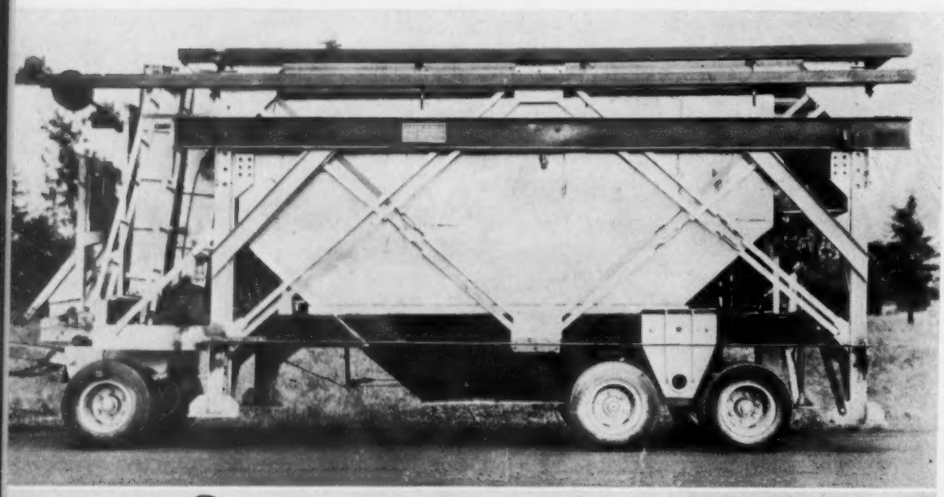
Inside the shell are 8-inch channel flights at 18-inch centers. Flights are bolted to angle lugs welded to the shell. Bolts are used so new flights can be installed quickly.

Drum is driven by a cast iron sprocket bolted to an angle-iron ring which is welded to the shell. At feed end of drum is a housing of 3/16-inch plate. A feed chute welded to end of the housing projects into drum, and a hopper is mounted at upper end of chute.

Dryer unit is of all welded except for the cast iron trunnions, bearing brackets, thrust wheel and sprocket. A 10 per cent saving in weight was achieved by welding this dryer, it is estimated.

A most important advantage gained through arc welding was saving of time required for design and construction.

In the spring of 1937 when the idea of a truly portable paving plant was conceived, we had just been awarded a large road surfacing contract, work to start as soon as possible. A hurried layout of the new plant was made and essential departures from conventional design indicated thereon. The layout was discussed with local jobbing shops to see if it would be possible to get the necessary structural elements fabricated in the time alloted. We



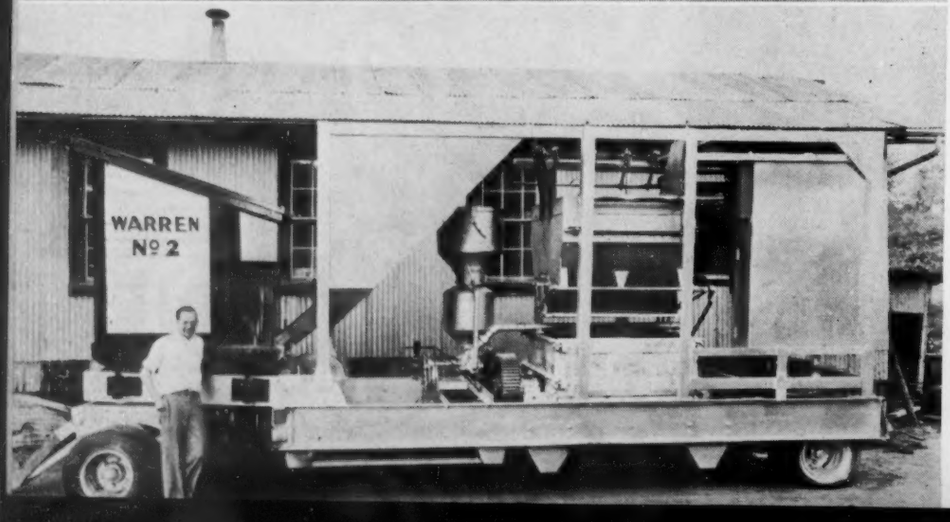
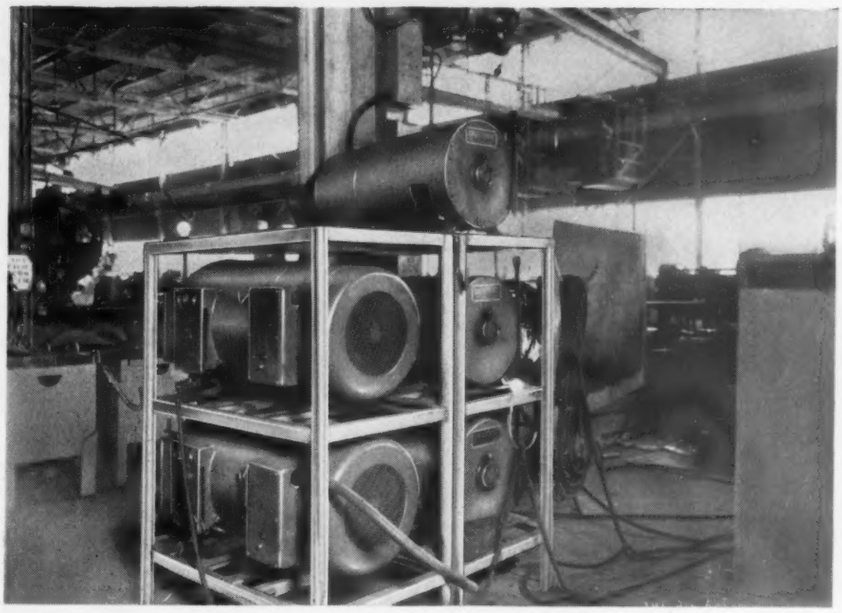


Fig. 2. (Upper)—This is Unit A, including the tower, bin and screen. Fig. 3. (Lower)—Here is Unit B. It includes mixer, scales, weigh box, levers, etc.

Cluster Arrangement Proves Advantageous



■ **Making tanks, walkways, separators and welded vessels requiring high quality welds necessitates use of 22 individual welding sets at Black, Sivalls & Bryson Inc., Oklahoma City, Okla. Locating the sets in "clusters" as shown above was found to aid greatly in spotting power lines, servicing welding sets and keeping plant floors clear. Photo courtesy Harnischfeger Corp., Milwaukee**

were advised that if details were submitted without delay and welding was specified throughout, it would be possible to meet our schedules. Otherwise there would be considerable delay.

Due to design flexibility permitted by arc welding and the feasibility of making changes without undue expense, we felt safe in submitting certain drawings to the shop before subsequent details had been worked out. As a result, fabrication started immediately on completion of the first detailed drawing, and subsequent drawings were never more than several days ahead of fabrication. Obviously this procedure would have been quite expensive if conventional unwelded construction had been employed.

The steel tower for Unit A was delivered in less than three weeks from the time the original detail drawing was submitted to the shop. The hopper, started one week later than the tower, was completed at the same time. The mixer platform with overflow bins and superstructure (Unit B) was delivered one week later. No thought was given to the dryer until several weeks after the bin and tower had been delivered, but when its design was finally decided upon, it was built in less than three weeks.

Immediately after delivery of the steel frames for Unit A and Unit B from the jobbing shops, our own shop proceeded to install all the machinery items, levers, scales, etc. Mounting of these items was frequently worked out on paper just a few hours ahead of the shop. It was during this part of the work that the many time saving advantages of welding technique made themselves especially manifest.

Only eight weeks elapsed from the time the first steel details went into the fabricating shop until the plant was rolling on its own wheels to its first job. Had it not been for arc welding, it would have taken at least twice as long to assemble the various units into a plant.

Second major advantage was the ability to save weight and thereby stay within the load limits allowed for vehicles on the state highways. Any accepted ratio of weights between welded and conventional unwelded structures will clearly show that this plant could not have been built without recourse to arc welding and remain within the weight limits. Entire plant, insofar as tower and dryer drum are concerned, is shipped on three trailers.

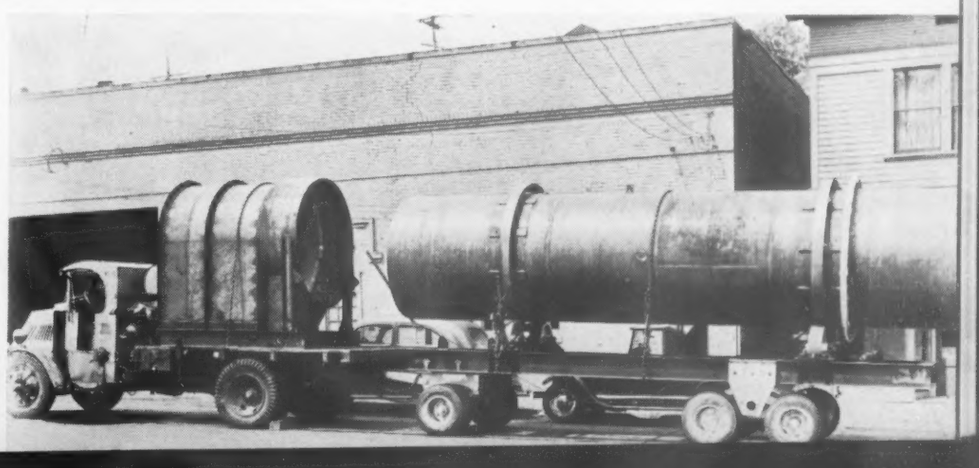
While it would have been possible to build a similar paving plant without welding, it would have necessitated dividing the plant differently. To transport it, four units, rather than three, would have been required. The result would have been a plant exactly 33 per cent more expensive to transport, which would have immediately reduced it to the status of its competitors.

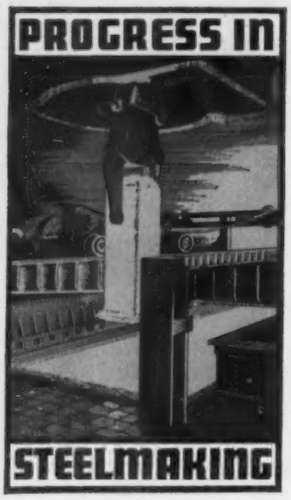
Welding Lowers Cost

Third major advantage of arc welding was the low cost involved. Cost of equipment is usually the chief limitation on the amount of work that highway contractors can perform. Period of usefulness of road equipment is severely limited by the short duration of the construction season and because the contractor is usually not awarded contracts suited to his equipment with any degree of regularity. Thus, a complete paving plant would not actually operate more than an average of four months per year, so equipment is used over long periods of time, in spite of obsolescence, to permit the tremendous investment to be written off without reflecting too severely in the prices bid for contract work. From this it follows that appropriations for major equipment must necessarily be seriously limited with the result that existing equipment is usually repaired unless the cost of new equipment can be brought within a fair distance of the cost of repairs.

To describe details of cost saving due to welding would be merely to repeat a frequently written thesis leading to a universally accepted conclusion. However, we experienced the usual savings from reduced weight, simplified detail, speedy construction and elimination of expensive patterns. These savings total approximately 40 per cent on the fabricated steel parts of this machine it is estimated.

Fig. 4—The dryer, Unit C, is shown here





Circular Annealing Covers

Steel producer obtains greatly increased uniformity in annealing with new units. Coil annealing costs reduced 50 per cent compared with old in-and-out type furnaces due to lower gas consumption, faster cycles and improved finish

By J. L. WHITTEN
Lee Wilson Engineering Co.
Cleveland

■ IN THE past year, Superior Steel Corp., Carnegie, Pa., has built a new annealing department and installed a number of circular bell type annealing covers for annealing wide and narrow strip steel in coils. The primary object in making this installation was to increase the quality through improving uniformity of annealing and brightness of the material.

These objects have been accomplished, but in addition to that there has been an extremely gratifying reduction in annealing cost per ton.

Fig. 1 shows a general view of the portion of the annealing department devoted to this type of furnace. Three radiant tube, gas fired furnaces are in the foreground. These furnaces were designed and erected by the Lee Wilson Engineering Co., Cleveland, and embody the well known principle of that company for the combustion of gas in vertical radiant tubes. As shown in Fig. 2, each furnace is provided with three bases. Thus through proper rotation of the furnace, it is always usefully employed in heating charges, while the two bases not covered by the furnace are either cooling or being unloaded and loaded.

The entire installation shows evidence of being well planned and well adapted to the requirements of this particular plant insofar as the crane and material movements are concerned. In the building where the furnaces are installed, existing sewer levels determined the depth to which equipment could be placed below the floor level. Also it was desired to maintain the base liquid seal lines at floor level where they could easily be seen. This permits all floor levels to be at the same height, an aid in handling and placing coils and covers.

To provide adequate crane clearance, the crane runways were raised 15 inches and a different, low head room trolley installed on the crane. This done, the one crane in this building is capable of handling the movement of all furnaces, inner covers and charges.

The building is laid out for the ultimate extension of the annealing department by adding more units. However, at one end of the building a separate room was constructed to house the instrument control panels, all switching and deoxidizing gas apparatus. This room is constructed with brick walls and is adjacent to an outer wall with large window areas so it is well lighted. It also is heated so the instruments always are kept well within the temperature required for best operation.

Control Centralized

This room provides for centralized control of the performance of the equipment as the temperature settings can be made, recirculating fans started and the gas flow regulated from this central point.

The three gas-fired furnaces are identical in charge size, being capable of holding coils stacked 84 inches high and of a diameter up to 45 inches. The average load charged is 16,000 pounds although at times the furnaces have been charged to 18,000 pounds. The charges, after being placed on the base, are covered with an inner cover which seals the space around the charge by being placed in a liquid seal on the base. The furnace which is placed over the charge and inner cover is fired with 12 vertical alloy steel tubes, 4½ inches outside diameter, 6 feet long and fired with gas at 12 pounds pressure. The tubes are all equidistant from the charge and each delivers equal heat.

Average time that the furnace is

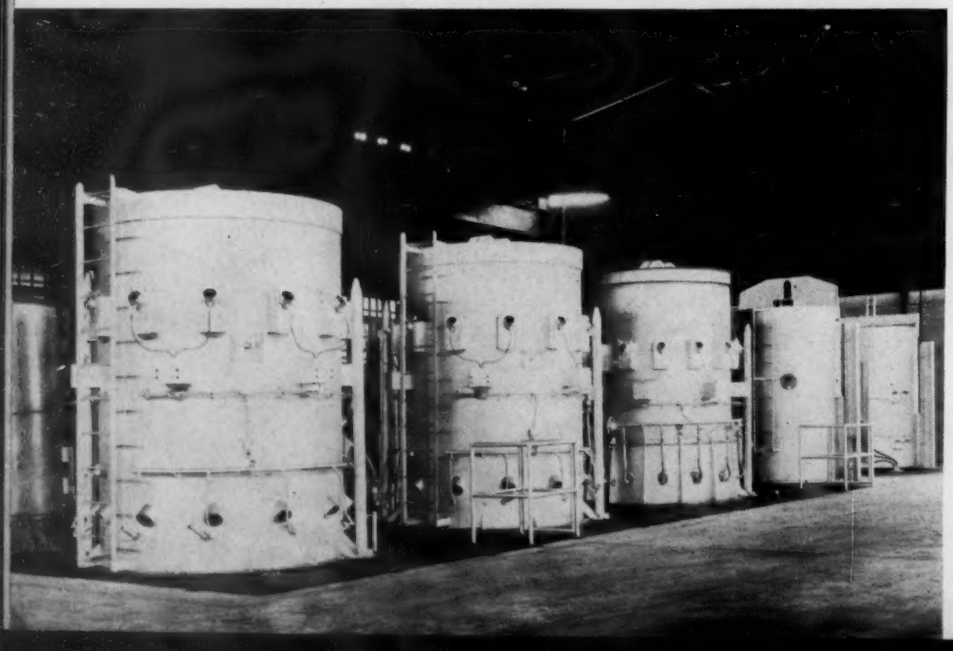


Fig. 1—General view of new coil annealing department at plant of Superior Steel Corp., Carnegie, Pa.

LESS COST PER TON OF STEEL ROLLED

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on the charge varies with the load, but in general the production from these furnaces is one-half ton per hour so a 16,000-pound charge of low carbon steel would be completely and uniformly annealed in approximately 16 hours. At the end of this time the furnace is lifted and moved to another charge. Complete cooling to 250 degrees Fahr. is accomplished in approximately 24 hours afterwards to make a total cycle of not over 40 hours for a charge of 16,000 pounds.

Similarly, a typical 7-ton charge requires about 5 hours to reach the annealing temperature of 1300 degrees Fahr. At end of this period, it is permitted to soak 9 hours, making a total heating cycle of 14 hours.

Water Sprays Speed Cooling

To expedite the cooling portion of the cycle, water sprays are used after the first 12 hours of cooling. The particular advantage of the base liquid seal, in addition to its sealing function, is that it provides a sump to collect the cooling water stream and pass it away into an overflow in a very simple manner.

The method of using this water cooling system has been well worked out by the operating and engineering departments of the Superior Steel Corp. Connections are provided between each two bases so the water spray ring can easily be turned from one base to the adjacent one from the same connection. This connection is part of the water supply system for the base seals.

High speed of heating on these furnaces can primarily be attributed to the method of heat application of the vertical radiant tube which heats from the bottom to the top of the charge and then lowers the radiant columns as the charge becomes saturated with temperature. Fuel gas enters the tubes at their bottom end. Heat is, therefore, first and last applied to the bottom of the charge, the point which is most difficult to heat.

Fans Transfer Heat

Heat application to the inside of the stack of coils is assured by use of a recirculating fan in the base, which moves the gases under the inner cover at an extremely high velocity and transfers the heat by convection to the center of the charge. These recirculating fans are of the air-cooled type and are provided with alloy shafts and fan blades suitable for withstanding the temperatures encountered. The speed of recirculation is such as to move the gases under the inner cover once every second, or 60 times every minute. This gas movement not only greatly aids in obtaining uniformity in annealing but also assures that all surfaces of the charge subject to the same treatment by the deoxidizing gas circulated under the inner cover.

The deoxidizing gas employed is cracked natural gas, refrigerated to a dewpoint of approximately plus 45 degrees Fahr. This gas is connected to each base from the main manifold. Main gas supply rated at 2000 cubic feet per minute is interconnected to other gas generating equipment in another portion of the mill. This older gas generator is rated 15,000 cubic feet per minute and thus assures an adequate reserve supply at all times. The liquid sealing arrangement on the base of these furnaces eliminates gas leakage and therefore results in a particularly low deoxidizing gas consumption.

These furnaces are equipped with a dual temperature control system so that the fuel input is regulated first from the tube temperatures. Then after the steel has reached its annealing temperature, it becomes the factor controlling the heat input. This feature, combined with the method of heating and the use of the recirculating fan, results in a fuel consumption per ton of steel annealed of approximately 985,000 B.t.u.

In starting up a furnace the electrical ignition is turned on by hand and left on during the first half-hour's operation. Automatic safety equipment operates to shut off the gas supply in event of failure of electric current or gas pressure, or if excessive tube temperature develops.

On the first installation some mild steel inner covers were used, but on the second and third jobs this was changed to 25-12 alloy. This stainless steel, while it has a considerably higher first cost, affords a decided saving available through its extremely long life and freedom from scale formation. Any scale formed of course results in an increased insulating effect and corresponding higher fuel costs to heat the charge.

Workable Arrangement

A glance at this annealing department immediately gives the impression of an extremely workable department. All piping is out of sight below the floor line. Nothing is in view but furnaces operating steadily at a job for which they were especially designed.

The object of improved uniformity has been reached in producing charges of steel with Rockwell B variation within three points for the entire charge. The material comes out of the furnace bright and, of course, scale free so it can be finally processed without any further surface treatment.

Compared with the old in-and-out type of furnace previously used, annealing costs per ton have been cut approximately 50 per cent. Gas consumption alone has been cut about 50 per cent. So the original object of quality improvement in annealing has been accomplished with a gratifying reduction in production costs.

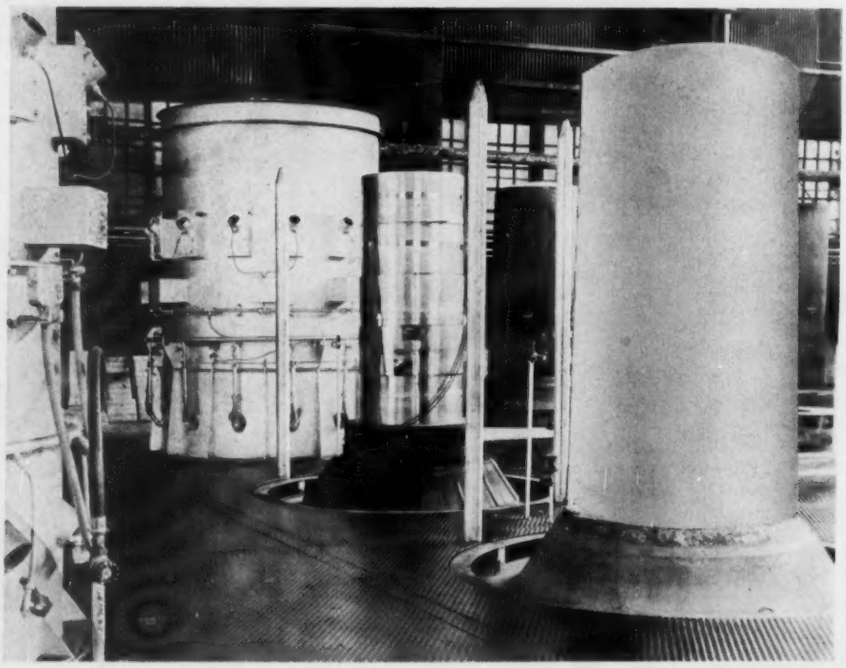

Fig. 2—Each annealing furnace works in connection with three bases. While one base with charge of coils is being heated, a second is cooling and a third is being prepared for heating. Thus covers are in constant use and maximum output is obtained from the equipment

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Canton, Ohio

Oxyacetylene Process Gains, Notably in the Oil Industry

■ HELD in Houston, Tex., the nation's oil capitol and center of a district containing substantially one-third of the petroleum resources of the United States, the thirty-ninth annual convention* of the International Acetylene association, March 8-10, was featured by a program of primary value to all interests identified with oil field and refinery operations. Safe ending of boiler tubes, welding and cutting in the plumbing, heating and air conditioning contracting field and current practice in fabricating and maintaining agricultural equipment also were discussed at length.

This was the first meeting of the association to be featured by a lecture. The lecturer was C. E. MacQuigg, dean of the college of engineering, Ohio state university, Columbus, O., and his subject was "Surface Hardening and Hard-Surfacing." The lecture described the correct use of the oxyacetylene flame in increasing resistance to wear and corrosion in widely varying services. It was followed by a panel discussion aimed at further informing designers, engineers and metallurgists of the full possibilities of surface hardening and hard-surfacing with different types of abrasion and corrosion resisting metals. Those participating were Dr. A. B. Kinzel, chief metallurgist, Union Carbide and Carbon Research Laboratories Inc., New York, John J. Crowe, research engineer, Air Reduction Sales Co., New York, and Ernest E. Thum, editor, *Metal Progress*, Cleveland.

Eases Maintenance Problem

Many California industrial plants that use steam boilers for power are located at great distances from sources of supplies. Hence the California industrial accident commission co-operates in every way possible to smooth out the maintenance problem. Among other things, it has set up a control for repairing and overhauling boilers. Under this control the fusion welding method of safe ending boiler tubes is used widely throughout the state.

Details of this control were set forth in a paper by Frank A. Page, supervising engineer of the commission with headquarters in San Francisco. Safe end welds may be made only by welders who have satisfied the commission's inspectors that they can make sound and ductile welds. Such welders are given a registration number which is good for one year provided they continue with the same employer, continue to make use of the same process and rod, and do not give cause for revocation of permit. Welds made by each authorized welder must be marked with that welder's number so that in the event of failure the blame automatically devolves on him. This California system, it was held in discussion, could be adopted advantageously in other states.

Discusses Hard-Facing of Bits

Hard facing of oil well drilling bits was the subject of an extended discussion by Charles H. Shapiro, chief metallurgist, Reed Roller Bit Co., Houston. His paper was illustrated by a large number of slides that showed the various application methods. Extensive use is made of thin-walled tubes filled with crushed, cast tungsten carbide. These are used in the same way as ordinary welding rods; the metal of the tube, after deposition, acts as a binding material for the tungsten carbide particles. Also employed are composite or amalgamated rods; these are made by placing molten low carbon steel on graded, crushed, irregularly shaped, tungsten carbide granules so as to form a rod. Tungsten carbide inserts also are used extensively to increase wear resistance. They are set partially in the base material in a pool that has been molten by use of the oxyacetylene flame or in a groove that has been made by grinding. After setting, the inserts and adjacent surfaces are covered with tube or composite metal. Mr. Shapiro's paper described in considerable detail the practice involved.

Flame cutting with small machines was the subject of a paper by Walter B. Van Wart, vice president, Wyatt Metal & Boiler Works, Dallas, Tex. These machines are versatile and handle economically such work as straightline cutting, beveling and inside and outside circle cutting. They produce cut edges which do not require machining as formerly. Work can be brought to these machines or they can be taken to the work. Frequently they are used in the field to cut sections which can be handled more conveniently in the field than in the shop.

Flame hardening in the manufacture of drilling equipment was discussed by Michael O'Hara, production manager, International Derrick & Equipment Co., Beaumont, Tex. Formerly sprockets were made with cast teeth which went through a simple grinding operation to knock off the rough spots. As a result, when the hardened and ground chain rollers passed over the sprockets, excessive stresses were set up in the chain because the root and pitch diameters were not true. The soft sprockets were worn on the pitch line of the teeth. This trouble has been eliminated by precision finishing of the teeth and flame hardening them. Mr. O'Hara described the technique in flame hardening. The operation is performed mechanically and produces uniform results at a favorable cost.

Practice of the Sinclair Prairie Oil Co. in gas welding oil well casing was described by G. R. Milton, that company's shop foreman at Arp, Tex. Recently welding time has been shortened by using multi-flame tips and a copper quenching clamp which allows the weld to be water-cooled.

A discussion of this paper by F. C. Hutchison, The Linde Air Products Co., Kansas City, went into great detail in describing the multiflame method. With this method, he said, design of the welding heads and manipulative technique make it possible to obtain consistent fusion for 90 to 95 per cent of the wall thickness through heat balance or equilibrium inherent in the preheating and fusion of the base metal, and the preheating and melting down of the filler rod. With reasonable supervision, training and qualification of operators, he said, efficiency of 80 to 90 per cent may be obtained with this process.

Oxyacetylene in Refineries

Henry Jouette, general welder foreman, Magnolia Petroleum Co., Beaumont, Tex., listed the applications of the oxyacetylene process in oil refineries; the process permits work that could be done in no other way and it cuts down construction and maintenance cost impressively. Metal spraying now is taking its place in the refinery, for corrosion, wear and heat resistance.

V. B. Poor, United Gas Pipe Line Co., Houston, Tex., reviewed latest practices in the pipeline construction field. Progress has resulted from new and improved rods and from the developments and widespread acceptance of the Wrinkle Bending method.

C. G. Alhart, welding supervisor, Texas Iron Works, Houston, described the many diversified applications of the oxyacetylene process in maintaining oil field equipment.

New developments in welding fittings are simplifying the construc-

*For election of officers and other details of the thirty-ninth annual meeting of the International Acetylene association, March 8-10, see STEEL of March 13, Page 26.

tion of piping systems in oil refineries and other industrial establishments according to E. Hall Taylor, vice president, Taylor Forge & Pipe Works, Chicago. He recommended that piping engineers make use of the new proposed standard for welding fittings, copies of which now may be had from the American Society of Mechanical Engineers, New York.

Under this revised standard engineers now can lay out pipelines with assurance that the fittings produced by the various manufacturers are being changed to conform to the standard dimensions. The new bevel angle for buttwelding, 37½ degrees, will require less weld metal, thus saving on welding time and material. Socket welding fittings, said Mr. Taylor, are coming increasingly into use in welding small diameter pipe. They simplify lining up and welding; they also eliminate the danger of burning through. Design of hub on buttweld flanges has been so improved that the heat of welding no longer warps the face of the flange. Now available is a new fitting which lines itself up; it has a centering ring integrally forged with the fitting.

Oxyacetylene shape cutting of oil field equipment parts was the subject of a paper by L. W. Stahl, plant manager and chief engineer, Emsco Derrick & Equipment Co., Houston. Mr. Stahl described various applications of the process, which permits savings and other advantages.

Gas Cutting Economics

Economics of machine gas cutting was discussed by G. M. Deming, Air Reduction Sales Co., New York. He outlined the approach to an answer to the question as to what is the approximate aggregate cost of producing any particular steel shape by oxygen cutting. He also discussed possible savings in such cutting by improving technique.

Welding of high pressure piping with wall thicknesses of ½-inch or more was discussed by Arthur N. Kugler, Air Reduction Sales Co., New York. For best results he recommended the Multilayer welding method, with Grade 10 welding rod for carbon steel pipe and rods of the same analysis as the base metal for alloy steel pipe. His paper detailed the practice involved and also outlined the determination of a proper stress-relieving or heat treatment method to insure a minimum of locked-up stresses.

Questions presented to the experts at the round table discussions concerned chiefly applications of the oxyacetylene process in oil field work and in oil refinery practice. About 1100 attended demonstrations of flame hardening, hard surfacing, casing welding and testing, while some 500 took part in the subsequent round table groups.

The oxyacetylene welding and cutting process is widely used in the manufacture and maintenance of farm equipment, according to a paper by Mills H. Byrom, division of agricultural engineering, Texas agricultural experiment station, Agricultural and Mechanical college of Texas, College Station, Tex. The paper set forth many examples. It also mentioned the advantages that come from hard-surfacing. Hardfacing of plowshares, for instance, multiplies their life by five.

Better Farm Machinery

Mr. Byrom's paper mentioned some important development work in farm machinery that has been completed or is in process. These include unusually large terracing machines, large bulldozers known as "tree-dozers" for uprooting large trees, garlic bulb diggers, machinery for eliminating prickly pears, garlic bulb dehydrators, small single-head grain sorghum threshers, mechanical cotton harvesters. Stainless steel is employed in the machine for killing prickly pears because of the corrosive poisonous liquid employed.

Oxyacetylene welding and cutting are employed increasingly in the plumbing, heating and air conditioning contracting field, according to Frank S. Wallace, C. Wallace Plumbing Co., Dallas, Tex. This is due to the fact that many welders now have accumulated wide experience in this field and know how to use the process to advantage. As a result better work is done, with greater economy.

Much progress has been made in educating users of the oxyacetylene process on the subject of fire hazards, reported J. I. Banash, the association's consulting engineer. A recent development, he said, is a question in some quarters as to whether the process involves a health hazard. So far as Mr. Banash had been able to determine from careful investigation no such health hazard exists.

In reporting as secretary of the association, H. F. Reinhard, New York, intimated that the oxyacetylene process now is widely understood and there is very little tendency on the part of the various state legislatures to consider measures in any way detrimental to the progress of this process.

Keynote speaker was J. H. Van Deventer, editor, *The Iron Age*, New York. The American system of enterprise, he declared, is threatened from two sources, the anti-machine complex at home and the totalitarian movement abroad. He cited the automobile and other industries to show how the machine has created vast new payrolls. He warned against intellectual radicals who think our method of government is out-of-date. He warned that continuation of deficit spending eventually will cause financial chaos which would bring about a dictatorship in this country. Much education is needed, he said, to protect us against these dangers.

In his address as retiring president, Elmer H. Smith, president, Commercial Gas Co., Minneapolis, compared (see STEEL of Feb. 27, Page 70) the present status of the oxyacetylene process with that of its early days. He predicted its continued growth as a servant of industry.

Award of the Morehead medal (see STEEL of Feb. 27, Page 74) was made to John J. Crowe, Air Reduction Sales Co., New York. Presentation was by C. D'W. Gibson, past president of the association, and vice president of Air Reduction Sales Co. He detailed the notable contributions by Mr. Crowe to the progress of the oxyacetylene process.

An interesting feature of the meeting was the report of the oxyacetylene committee read by James W. Dunham, vice president, National Cylinder Gas Co., Chicago. It set forth in a broad way (see STEEL of Feb. 27, Page 60) the progress that has been made in this field during the past year.

♦

Pencil Drawings Produce Excellent Blueprints

■ Under the name of Pencil-tex, Frederick Post Co., Chicago, has introduced a new pencil drafting cloth. Similar in appearance to fine tracing cloth, this material has a velvety surface with a high affinity for pencils of all degrees of hardness. It is said that even the hardest of pencils will leave a sharp, uniform, ink-dense line. This line intensity, together with a glass-like transparency, permits production of blueprints having the sharp contrast of prints made from ink tracings.

High Speed Enamels Reduce Finishing Time

■ A line of synthetic enamels with short baking schedules, has been developed by Maas & Waldstein Co., Newark, N. J. Known as Polydur enamels, these finishes set in only a few minutes. Their baking schedules depend upon the temperature, but at 325 degrees Fahr. they bake to a good finish without discoloration in 15 minutes. Finish is said to be durable and resistant to marring, moisture and corrosive action of ordinary household chemicals.

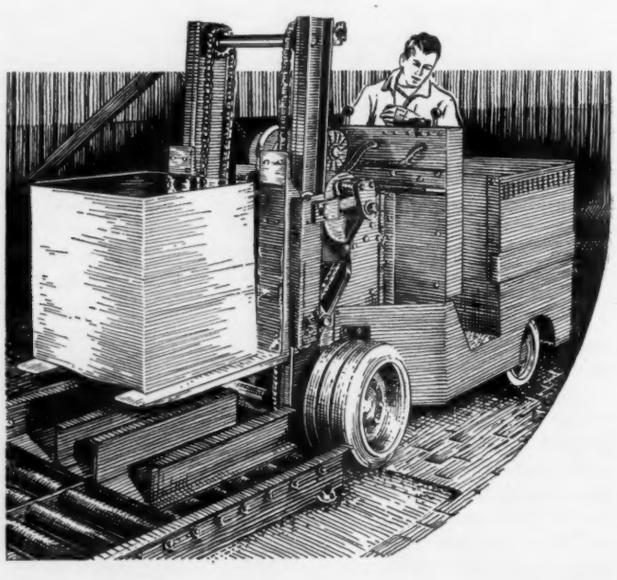
I'm going to hunt for a *good storage battery!*

THAT'S what Thomas A. Edison said forty years ago and for ten long years he and his associate engineers hunted. They conducted over 50,000 experiments before they found that good storage battery! His specifications for that good storage battery insisted that it be rugged, foolproof, economical and dependable.

Of these specifications, the most important was *dependability;* it must be a battery, Edison insisted, that would be free of self-destructive reactions, one that would be mechanically the strongest ever made. And that's one of the many very important characteristics of the Edison Steel Alkaline Battery of today and is one of the big reasons—

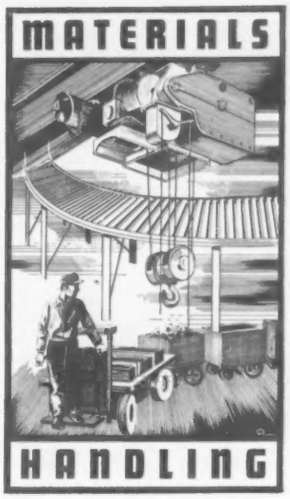
...Over Half the Battery Industrial Trucks in America are Powered by *Steel Alkaline Batteries*

Modern battery industrial trucks are one of industry's foremost material-handling tools—are often its sole reliance for unfailing production flow. They *must* have unfailing power, else congestion... delay... even a shut-down... may follow. Naturally the majority are run by Edison Batteries—above all else they are *dependable.*



EDISON STORAGE BATTERY

DIVISION OF THOMAS A. EDISON INCORPORATED • WEST ORANGE, N. J.



Steel Straps

Use of modern steel strapping methods with inexpensive, nonreturnable, wood skids permits packaging large numbers of small or awkwardly shaped pieces in one unit, easily loaded, shipped, unloaded and stored. Economies also achieved with large structural members

By J. G. BACUSS
Acme Steel Co.
Chicago

■ MATERIALS handling developments are not confined alone to moving material through plants during processing and fabricating operations. Also of extreme importance is the handling of incoming shipments as well as packaging of outgoing material.

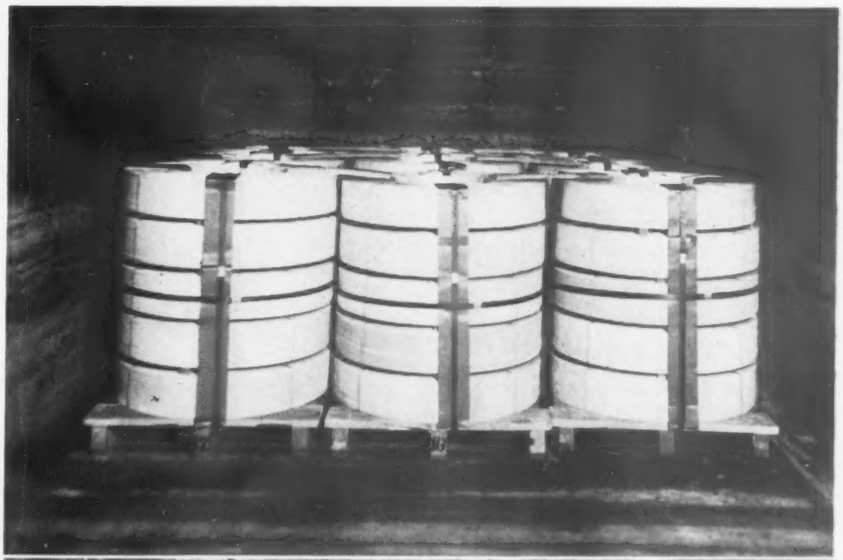
Recent improvements in shipping methods include greatly enlarged use of steel strapping systems which may or may not involve the use of unit-load packaging methods. Perhaps no group in the industrial system is more responsive to the wishes and needs of their customers than the steel and steel products industries. Thus there is continued emphasis being placed on betterment of shipping methods all along the line.

Recent improvements of particular interest involve changes in packaging and bracing of steel bars, cold drawn steel rods and structural shapes for shipment. Principal advantages of course are easier handling by means of cranes or trucks with subsequent lower costs, and better protection to the product during loading, shipment and unloading. These are often accompanied by lower freight costs due to increased loads that can be placed in a car.

Where material is to move in open cars, individual bundles for export may receive additional protection through the use of water-proof paper and steel bands fastening them to skids. The individual bundles then can be assembled into one large unit in the car and further braced with bands to effect safe delivery of the material with economy of time and labor in unloading operations.

Use of an inexpensive nonreturnable skid in conjunction with steel band reinforcements makes possible shipment of semifinished and finished steel products in a most efficient manner. It not only reduces the cost at the shipper's plant as well as at the receiver's, but these methods insure delivery of the product in first-class condition.

A most recent development in the use of flat steel bands to reduce considerably the cost of bracing is in fastening twin or triple loads of structural shapes together. This



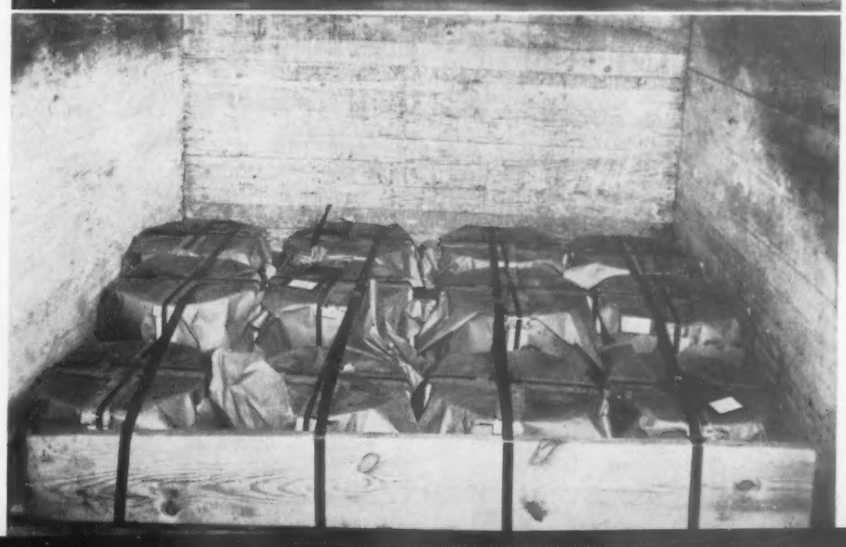


Fig. 1. (Upper)—Narrow width steel strip in coils, loaded in units of five and strapped to a nonreturnable skid. Fig. 2. (Lower)—Steel disks, paper wrapped and steel banded, are delivered safely

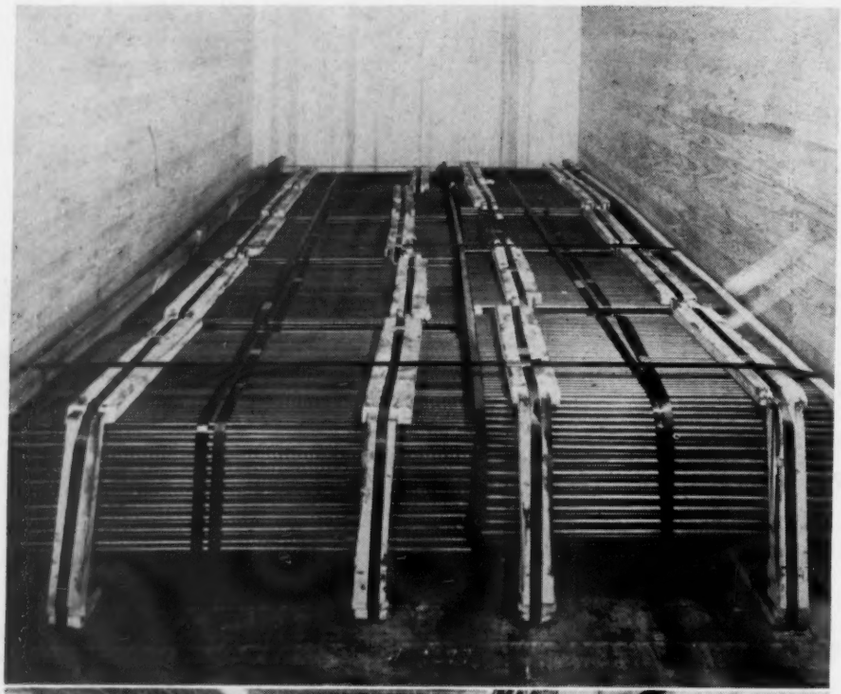


Fig. 3. (Top)—Here 25,000 pounds of material, 10 skid loads, are packaged and braced in car with steel bands. Fig. 4. (Center)—Steel strip or flats, bundled and anchored in car. Fig. 5. (Bottom)—Structural shapes bundled on a flat car

method is particularly valuable, as it makes possible elimination of excessive amount of time and labor involved in both shipping and receiving in placing and removing a large amount of timber bracing formerly required.

Engineers are daily exploring and developing new steel strapping methods in the fields of better packaging and handling of steel products. Handling economies obtained are second only to the improved condition of the product on arrival, a most important factor in many instances.

Fig. 1 illustrates an application which has given excellent results. Here narrow width strip steel coils are banded together in units of five and steel strapped to a simple non-returnable skid. Previously coils were loaded individually in the car requiring 14 man hours of time. This also includes the time required for transporting each coil, weighing and loading. An additional one-half man hour was needed to cut small wooden strips which were placed on the car floor. To brace the coils effectively, 84 board feet of lumber were needed with 480 pieces of 2-inch lath cut to 4-foot lengths.

Shipper Saves One-Third

Contrast this with the new method involving two man hours to load the car and only $6.90 worth of lumber needed to construct the 16 skids which are used with a minimum car load of 40,000 pounds of material. Saving in material and time alone is exactly 33 per cent! This is the shipper's saving.

The receiver also saves because he can unload the car with either a hand or power truck in an hour or two. There is no lumber bracing to remove and the consignee merely snips the bands to unpack the material. In addition there is a further saving possible in that the coils need not be stacked. They can be placed in the warehouse on the skids directly from the car. This eliminates all possibility of damage during handling. With highly finished strip such protection is of extreme importance and may effect significant savings from this cause alone.

Fig. 2 illustrates another application of steel strapping that has proved of value. Twelve bundles of steel disks are strapped as a unit in this instance. Formerly the disks were shipped loose. While the present method of bracing shown in Fig.

(*Please turn to Page* 74)

p&h

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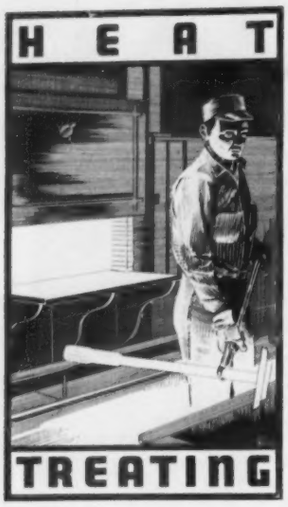


Controlled Annealing

Flexibility of this furnace's design makes possible the production of more definite microstructures in high carbon and alloy steel bolt stock, thus meeting consumer's particular demands

By **RALPH M. DREWS**
Assistant Superintendent
Bolt and Nut division
Republic Steel Corp.
Cleveland

□ WITH THE replacement in recent years of low carbon steel by the more and more widespread use of high carbon and alloy steels, new problems in the annealing of bolt stock have had to be solved to permit production of high quality cold-headed bolts, particularly in cases where severe upsetting must be employed.

High carbon and alloy steels must be made sufficiently ductile to shape the bolt head and to withstand terrific pressures to which they are subjected in cold heading. On the other hand, they also must have good machining qualities if the bolt is of a type that requires this operation.

Solution of the problem of producing just the proper degree of ductility and machineability in high carbon and alloy steels is found in normalizing or spheroidizing or in production of a balanced grain structure that will best suit the requirement.

To perform these necessary annealing operations a new furnace, which is of rather unique design, was recently installed in the Cleveland plant of Republic Steel Corp.'s Bolt and Nut division. This furnace has unusual flexibility that makes it possible to produce very definite microstructures in bolt stock and, in that way, to meet particular demands of consumers which are becoming more and more exacting.

The new furnace, see Fig. 1, is of bell type design, equipped with radiant combustion tubes, and is approximately 9 feet square, 10 feet high, and is lined with 9 inches of firebrick. Combustion tubes are 4 inches in diameter and are chromium nickel heat-resisting steel.

Equipment for handling the charge of coils was specially designed and built by Republic. Coils are brought to the furnace on a handling pin which is guided onto a tilting device where it is upended, leaving coils on the heating pin in a vertical position. The pin of coils, holding from 4000 to 6000 pounds depending upon the coil diameter, then is lifted onto a furnace base and covered with a cylindrical heating cover. Heating cover is 8 feet

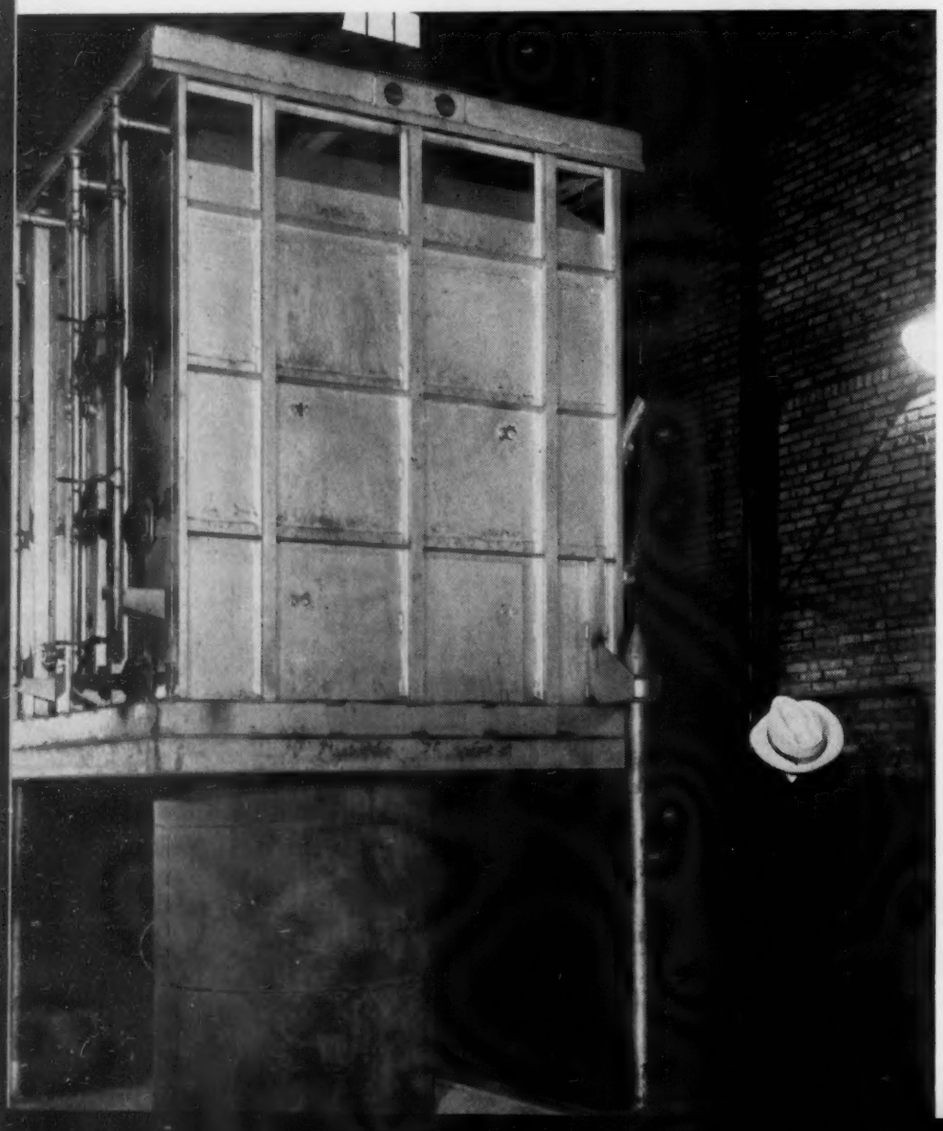


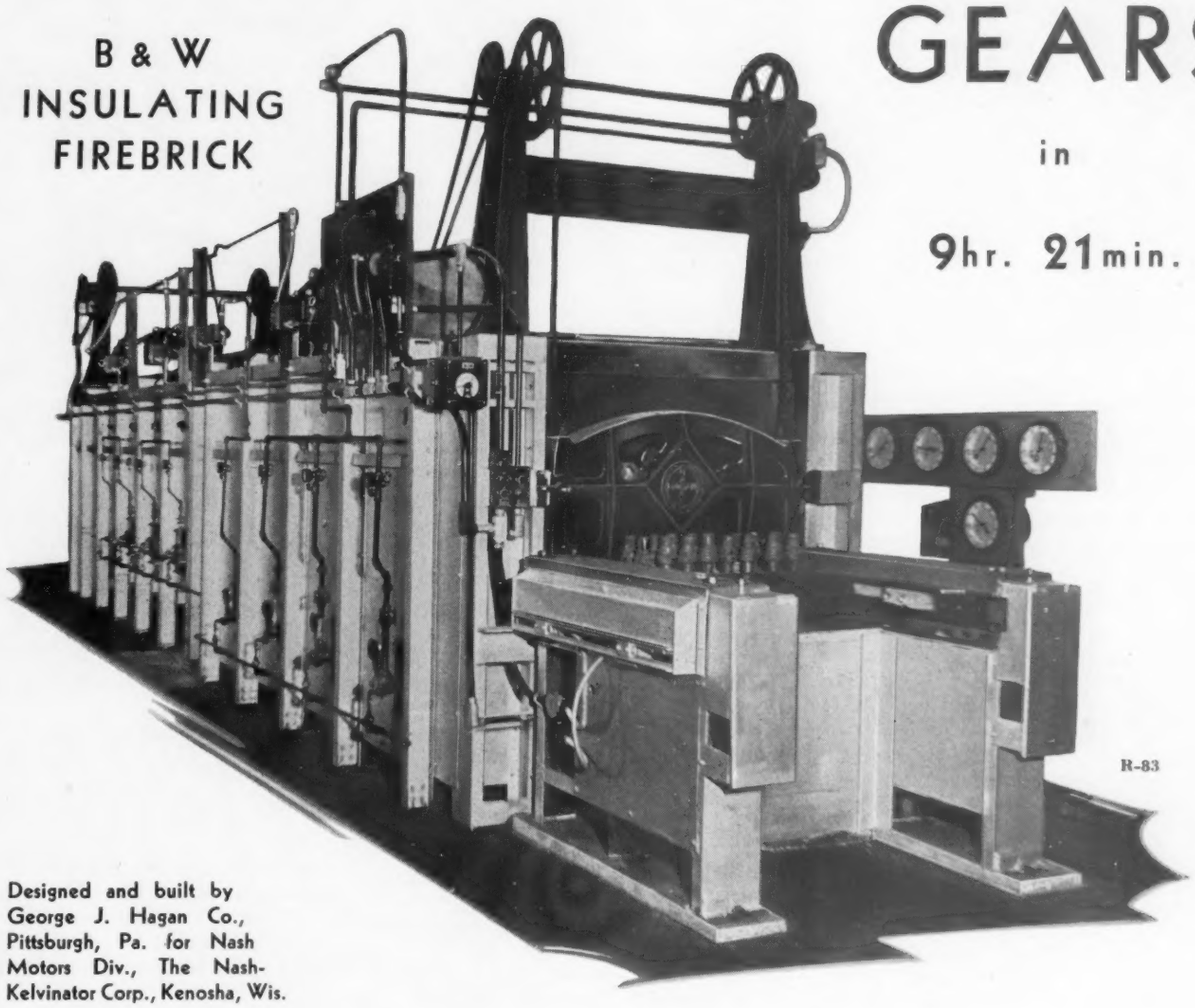
Fig. 1—Annealing furnace being set down over a charge of coils, which is protected by a heating cover. Use of this cover together with radiant tubes in furnace provides a heating method that can be closely controlled

SPHEROIDIZES NASH TRANSMISSION GEARS

B & W INSULATING FIREBRICK

in

9hr. 21min.



R-83

Designed and built by George J. Hagan Co., Pittsburgh, Pa. for Nash Motors Div., The Nash-Kelvinator Corp., Kenosha, Wis.

Lined with 9 in. of B&W K-22 Insulating Firebrick, this furnace is an important part of the equipment used in building Nash and Lafayette cars. Transmission gears made of SAE 4620 steel are normalized at 1600 F., brought down rapidly to 1300 F. by means of water coils, and annealed from 1100 F. to 700 F.—all in one furnace.

The furnace is underfired with gas. Fuel consumption, 745 B.t.u.'s per gross pound; capacity, 1130 lb. per hour, maximum.

B&W Insulating Firebrick in industrial furnaces mean low heat-storage, low fuel consumption, uniform heating, and long refractory life.

TECHNICAL DATA SUPPLIED UPON REQUEST.

THE BABCOCK & WILCOX COMPANY Refractories Division 19 Rector Street, New York, N. Y.

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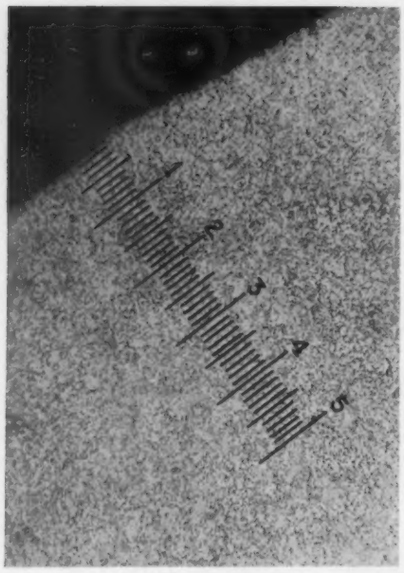

Fig. 2—Photomicrograph at 100 diameters, showing typical bolt steel spheroidized in the new furnace with negligible decarburization. Each graduation is 0.001-inch

high, 5 feet in diameter and is made of heat-resisting Enduro NC-3 and HCN stainless steel.

Cooling cover is similar to frame of the furnace, but is slightly smaller in size, see Fig. 3. It is steel and is insulated with 6 inches of pressed insulating material.

After charge is carefully sealed with sand inside the cover, furnace is set down over the charge, which then is heated to develop particular grain structure desired.

Heating is done with natural gas, and combustion takes place within the spirals of heat-resisting radiant tubes. Use of radiant tubes in connection with a heating cover provides a heating method that can be closely and accurately controlled and, at the same time, eliminates danger of overheating in spots. Furnace is equipped with 2-point pyrometer control, one point near the base, the other near top of the furnace. There are also two pyrometer controls in the charge, running entire length of the charge.

Fig. 3—Charge of coils, ready to be placed under heating cover, at left, on first heating base. On second heating base at center is the cooling cover, and on the third is the furnace. Guides in foreground are for tilting device

As heating progresses, temperatures are recorded automatically. A reversible fan, located in the center of the furnace base, then is set in motion to distribute heat as required. This fan makes possible very even heat distribution. If top of the charge is heating too fast, for instance, fan can be reversed and heat will be confined to the lower section. By varying speed of the fan this distribution process can be hastened or retarded.

Heat Control Important

Very even distribution and close control of heat within the furnace is most important. This is true particularly when producing spheroidized structures, since the steel is worked close to the critical range. If the temperature at any point is even 50 degrees higher than the prescribed temperature, sections so heated will produce pearlitic or sorbitic structures which may have a deleterious effect in the subsequent cold heading operation.

After desired temperature is reached and steel is properly soaked, facilities of the furnace make available any rate of cooling needed to produce desired grain structure. Charge can be cooled in the furnace. If faster cooling is required, furnace can be removed and charge covered with a special cooling cover. If air-quenched structures are desired, furnace can be removed and charge left with only the heating cover on. Or heating cover can be removed and the charge cooled without any covering. If this cooling is not rapid enough the fan can be used on the uncovered charge.

One of the most important functions of the furnace is to prevent decarburization. On other types of furnaces, decarburization runs as high as 20 and 25 thousandths of an inch. Such high decarburization now is intolerable in bolt stock, especially when it is used for high

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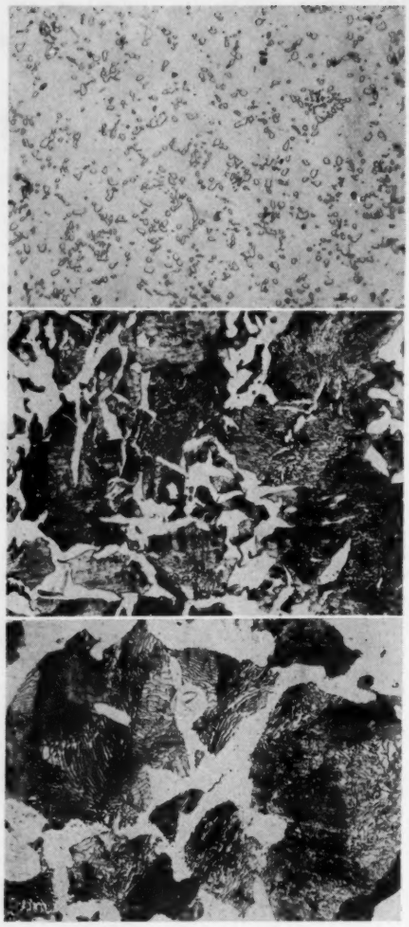

Fig. 4—These photomicrographs illustrate furnace's control of microstructures in bolt stock. Here is SAE 1035 steel with a spheroidized structure (top), a lamellar structure (center), and a coarse grained sorbitic structure (bottom). Machining qualities increase reading from top to bottom, and heading qualities conversely. Top photomicrograph is at 1000 diameters and the other two at 500 diameters

Emergency Oven Is Built Quickly

■ RECENTLY a manufacturer of outboard motors and domestic coal stokers was confronted with a comparatively simple problem, yet one which required immediate action. A number of sample motors of a new design were required to meet opening date for a national show. With scarcely a week remaining it was decided to change the finish on the gasoline tank to a sprayed enamel which required baking. Close temperature control was most essential.

Thus it was necessary to design an oven that could be in operation within the week and yet would be suitable for continuous production needs later on. According to J. H. Miller of the Indiana General Service Co., an effective solution was worked out as follows. A box type oven 3 feet deep 4 feet wide and 6 feet high was constructed of 16-gage steel sheet with 1-inch angle iron bracing, all fabricated by welding. Four inches of rock wool were placed on top and sides, and an outer box placed over this.

The inner box was spaced by welding on short pieces of angle iron, and the insulation was put in through manholes at top of panels. An angle iron rack for supporting work was mounted on wheels to permit loading it outside of the oven. The accompanying photograph shows completed oven with loaded rack in place.

Heating of the oven was accomplished by installing two, 3.8 kilowatt, 110 volt, oven heaters as heat calculations showed a maximum requirement of 6 kilowatts for a charge of 90 tanks together with supporting rack and proper ventilation. Ample space was left for additional heating units which might be required later on to handle shorter cycles and increased loading. A contactor and thermostat automatically control operation of electric heating units. The oven heaters are mounted on lower sides of the oven with the thermostat bulb at the top of the heated portion and projecting as close to the work as possible.

Since the electric heating units were carried in stock by a local concern, construction was completed immediately. Also the entire 1938 output of steel tanks was handled in the unit. Results have been excellent, it is reported, and the oven found sufficiently flexible to meet changes in time cycles and temperature settings. Compact construction of the unit permits locating it adtion line.

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A.S.T.M. Publishes Index Covering Its Standards

■ American Society for Testing Materials, 260 South Broad street, Philadelphia, has issued its 1939 "Index to Standards and Tentative Standards" giving information on all of the 870 standards as of the first of this year. The index is of service to anyone wishing to ascertain whether the society has issued standard specifications, test methods, or definitions covering a particular engineering material or subject and it is of help in locating the standards in the volume where they appear.

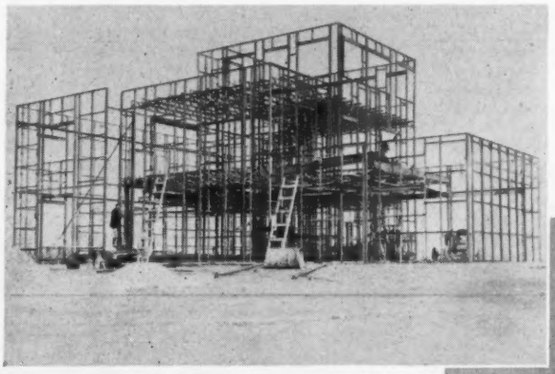
All items are listed in the index under appropriate key words according to the particular subjects they cover. As a convenience a list is given of the specifications and tests in numeric sequence of their serial designations. Copies of this publication are furnished without charge upon written request to society headquarters.

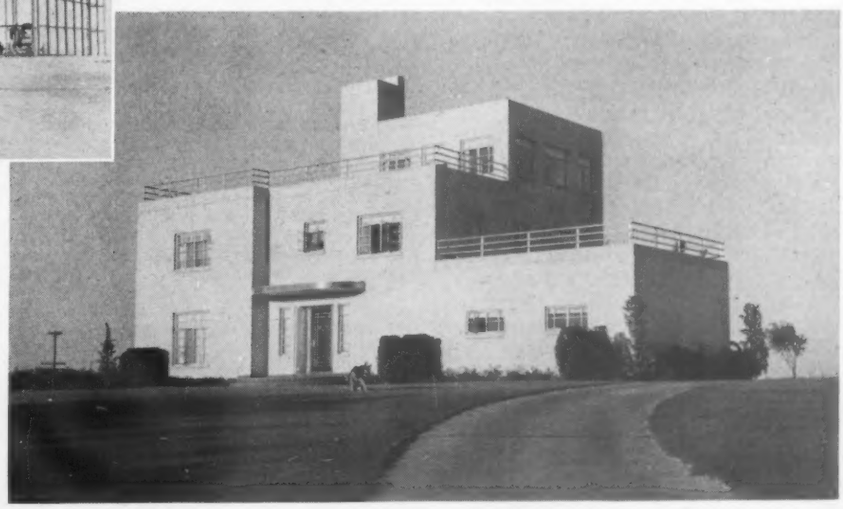
Bulletins Describe New Uses for Power Hammers

■ C. C. Bradley & Son Inc., Syracuse, N. Y., has undertaken preparation of a series of educational bulletins, the purpose of which is to describe new uses of the company's cushioned power hammers in general manufacturing plants for a wide range of production and special operations embracing forging, toolmaking, tool redressing, welding and general blacksmithing. The bulletins picture various types and sizes of hammers, dies and work produced.

Three bulletins have been issued thus far, the first dealing with drawing and forming of tubing; the second with a method for producing hand-hammered finishes on ornamental steel and iron products and a method for cold forming stainless steel rods; and the third with metal forming to close tolerances in impression dies.

Arc Welds 96,000-Pound Steel Frame for 12-Room House





■ **This imposing residence of John Wilson, president, Wilson Mfg. Co., Wichita Falls, Tex., has two sundecks, an elevator and year-round air conditioning. Steel beams are 2 x 2 x ¼-inch angle top and bottom flange with 1½ x 1½ x $\frac{3}{16}$-inch lattice, welded in a fixture at a speed of 1 foot per minute. Beams are 10 inches deep; maximum span is 18 feet. Rock wood fills space in walls. Photo courtesy Lincoln Electric Co., Cleveland**

A.S.T.M. Committees Set Up New Standards; Revise Old

■ A NUMBER of new specifications and tests and many modifications in existing standards and procedures were approved by committees of the American Society for Testing Materials, meeting at the Deshler-Wallick hotel, Columbus, O., March 6-10, in connection with the society's 1939 Committee Week. During the five-day period, some 150 meetings of standing committees and their subgroups were held.

Since this is the year in which the society will publish its triennial book of standards, committees are unusually active. Many new specifications and tests are to be issued covering materials not heretofore embraced in A. S. T. M. standardization work.

Among the committees holding sessions were a number dealing with iron and steel, nonferrous metals, refractories, coal and coke, and spectrographic analysis. Recommendations of the committees involving new standards, tentative standards, or changes and modifications in existing standards, will be subjected to letter ballot of the committees, then will be referred to the society at its forty-second annual meeting in Atlantic City, N. J., June 26-30, for formal approval.

Conducts Regional Meeting

Two symposiums, one on thermal insulating materials, sponsored by committee C-16 on thermal insulating materials, and the other on lime, sponsored by committee C-7 on lime, were held March 8, these constituting the society's 1939 regional meeting. General purpose of the former symposium was to point out important problems in the field of standardization and research which need to be considered by committee C-16.

Contributing a paper on "Factors Influencing the Thermal Conductivity of Nonmetallic Materials," J. B. Austin, research laboratory, United States Steel Corp., Kearny, N. J., gave a comprehensive survey and summary of fundamental problems in the physics of heat flow and the physics and chemistry of insulating materials. In connection with chemical compositions, he stated that those compounds which have a simple molecular structure and which crystallize in a lattice of high symmetry, as for example, magnesia, which crystallizes in the isometric system, are better conductors than more complex compounds such as forsterite (magnesium silicate).

Among the simpler compounds, the speaker continued, the best conductors are those whose component atoms have most nearly the same weight and the same electronic structure. Physical constitution has a larger influence on thermal conductivity than any other single variable. This is well illustrated by magnesia, which in the crystalline pore-free form is one of the best conductors among the refractory oxides, but in the form of powder ("precipitated magnesia") is one of the best refractory insulators.

Effectiveness of the powder as an insulator is due to the presence of a film of air around each particle and is not a property of the magnesia itself; nevertheless, the difference in the conductivity of the two materials, which is of the order of a hundred fold, is a striking illustration of the influence of texture.

Following are summaries of the more important work performed by A. S. T. M. committees in the metals, fuels and refractories fields:

Committee A-1 on Steel

A further effort will be made to consolidate specifications covering mild steel plates (A 10) and steel plates for forge welding (A 78), a report being expected at the June meeting. A section to draft recommended standardized requirements for structural bolt steel will be appointed. There was much discussion on possibility of consolidating specifications for steel for bridges (A 7) and for buildings (A 9). A proposed change in title of (A 7) with definite scope clauses to be added to both specifications was considered and it was decided to study further possibility of a consolidated specification.

Recommendations were made to approve editorial changes and substance changes in the four specifications covering various types of steel springs, elliptical and helical. Titles and scope clauses of certain of the specifications will be changed to indicate a broader application and other modifications will be detailed in the 1939 A-1 report. Likewise, changes were proposed in the five specifications covering various types of spring bar steel, tables of permissible variations being brought up to date. Specification covering carbon-steel bars for general purpose springs (A 58) will be studied for the June meeting with a view to its revision or withdrawal. Specifications covering carbon-steel bars (A 14) and carbon-steel bars may be combined with special silicon requirements (A 68) and for vehicle and general purpose springs (A 58).

Section on carbon-steel forgings reported a substantial consensus on a proposed specification providing for seven classes of forgings. This new specification will replace carbon-steel requirements in the three existing specifications (A 18), (A 19) and (A 20), and brings up to date certain of the requirements. Tensile strength of the various grades ranges from 47,000 to 90,000 pounds per square inch with yield point of 25,000 to 55,000 pounds per square inch.

Work on combined specifications covering alloy steel forgings resulted in a draft to be submitted for consideration and comment. It is expected requirements can be issued as a new specification by action at the June meeting.

Specifications covering carbon-steel castings for miscellaneous industrial uses (A 27) were recommended for adoption. New specifications for carbon steel castings for miscellaneous industrial uses suitable for fusion and welding were submitted for approval. The eight grades of material covered have a maximum carbon of 0.25 or 0.35 per cent with the top manganese at 0.70, but with a special provision for an increase in manganese for a reduction below the maximum carbon content. Tensile strengths range from 60,000 to 70,000 pounds per square inch; yield point from 30,000 to 38,000 pounds per square inch.

New specifications covering alloy steel boiler and super heater tubes were approved subject to ballot. Thirteen grades of material are set up, nine of which are ferritic and four austenitic, the minimum tensile strength for the ferritic, 60,000 pounds per square inch; for the austenitic, 75,000 pounds per square inch, with respective yield points of 25,000 and 30,000 pounds per square inch. This proposed specification will be published in the 1939 report of the steel committee prior to the June meeting. Action was taken also to recommend new specifications for electric-resistance welded heat-exchanger and condenser tubes; electric-resistance-welded heat-exchanger and condenser tubes; electric-resistance-welded steel boiler tubes for high-pressure service are expected to be covered shortly in another new specification.

A proposed combination of specifications covering carbon-silicon steel plates (A 149) and (A 150) was approved, two grades being set up: One, requiring a tensile strength of 65,000 to 77,000 pounds per square inch; the other, 70,000 to 82,000 pounds per square inch. This specification covers material up to 4½ inches in thickness but not exceeding 25,000 pounds theoretical weight for plates of over 4¼ to 4½ inches inclusive in thickness.

A demand for requirements for a higher strength rivet steel than the present one covered in the specifications for boiler rivet steel (A 31), namely, a 45,000 to 55,000 pounds per square inch grade will be met by incorporating a second grade with a 58,000 to 68,000 pounds per square inch tensile range in existing specifications.

Consideration has been given to requirements which should be incorporated on speed of testing. In view of some differences of opinion, particularly on the limiting speeds from the yield point to the ultimate strength and necessity of getting more detailed information on speeds now in effect in the various steel products fields, it is planned to send a questionnaire to elicit these data which then will be studied before final recommendations are made.

Committee A-2 on Wrought Iron

Minor changes in the requirements for welded wrought-iron pipe (A 72) were reported. Also a revision requiring pipe to be made from "all pig puddled or processed" wrought iron was adopted.

Elongation requirements of the single and double-refined bar specifications (A 189) are to be brought in line with those for common iron bars (A 85) and rolled or forged blooms (A 73), and the specification will cover material up to a total cross-sectional area of 12 square inches. The following tentative specifications are recommended for adoption as standard: Plates (A 42); rolled shapes and bars (A 207); uncoated sheets (A 162) and zinc-coated sheets (A 163).

An editorial change stating that the material "shall be piled, forged and

rolled twice" is to be made in the requirements for forgings and blooms (A 73). Existing revisions are to be adopted in chain specifications (A 56), including revised proof test loads which are to be 38 per cent of the breaking load.

Committee A-3 on Cast Iron

An investigation of chilled iron tension test specimens is being conducted. A drawing of a proposed impact testing machine is to be submitted shortly for study and comment. Soil pipe specifications are to be brought into line with other requirements.

Work on pressure pipe was discussed, a subcommittee on this material being in the course of organization. Action was taken to carry on the investigation of overstressing of cast iron in the 20,000 and 50,000 pounds per square inch classes.

Committee A-5 on Corrosion of Iron and Steel

Several extensive outdoor exposure tests are under way. Exposure tests of black iron and steel sheets at Annapolis, under way continuously for over 22 years, are being continued. Tests on galvanized sheets, coated hardware and structural shapes, etc., are being inspected regularly at various test sites. In the total-immersion tests, all but two of the specimens have failed so this research will be completed within the coming year.

Extensive tests involving many miles and thousands of specimens of farm-field fencing, barbed wire, unfabricated wire, wire strand, and chain-link fence, with test locations at eleven points from coast to coast, are determining the effect of base-metal composition, gage, type of coating, weight of coating, etc., on the serviceability of zinc-coated strand, barbed and woven wire fencing and unfabricated wire.

Already about 17 per cent of the bare wire material has been brought in from the test sites for physical tests to determine loss in strength. Of the coated samples, 2 per cent have been brought in and subjected to tension tests. Extensive tables resulting from these tests are to be studied and published in the 1939 report of Committee A-5. The material has been on exposure for about 2¼ years, practically all of the test stations having been erected in the period, Nov. 15 to Dec. 26, 1936. Referee tests of the materials in this program also will be published in the 1939 report. These will include complete data on the original materials exposed.

Revisions will be recommended in several existing specifications providing requirements for protective coatings on wire and wire products. A general review of other specifications has been made, three of which covering electrodeposited coatings on steel are to be revised this year, prescribed methods of taking samples to be included. Proposed methods for determining thickness of electrodeposited coatings will be recommended during the year as a new tentative standard. It was decided to submit to letter ballot the question of whether methods of determining weight of coating on tin, terne and lead-coated sheets (A 91) is up to date, this reaffirmation being decided upon since the standard has not been changed for a number of years.

Sections on the Preece test will be removed from the method of testing weight and uniformity of coating (A 90), the method in the future to cover only tests for determining weight of coatings. A general method for conducting the Preece test for uniformity of coating is being prepared. This will include procedures given in the existing A.S.T.M. methods (A 191) and (A 208) covering uniformity of coating by the Preece test on zinc-coated iron or steel wire and on steel castings, forgings and related shapes. It will also include a procedure for determining uniformity of coating of bolts, nuts and similar coated articles.

Committee A-7 on Malleable-Iron Castings

Tentative specifications for cupola malleable iron has been recommended for adoption. These call for a minimum tensile strength of 40,000 pounds per square inch; minimum yield point of 30,000 pounds per square inch and elongation in 2 inches of 5 per cent. Since no suggestions had been received of changes desirable in the standard requirements for castings made by the air-furnace, open-hearth or electric-furnace process (A 47), these are to stand unaltered.

Proposed specifications for pearlitic malleable iron were discussed and approved for a letter ballot vote. It was decided to prepare a report on the welding of malleable iron castings for consideration at the June meeting.

Committee A-10 on Iron Chromium, Iron-Chromium-Nickel and Related Alloys

A guide or recommended practice for corrosion testing in plant equipment is planned. The procedures were considered and after review by interested committees will be submitted for publication. Installations of plain chromium and chromium-nickel steel used for architectural purposes in New York, Philadelphia and Atlantic City have been examined to determine the conditions of the material after exposure to industrial and sea coast atmosphere. A report will give results of inspection and include chemical composition of the materials, method of fabrication, etc. This information will be included in the 1939 report of Committee A-10.

Another report on metallography involves a study of intergranular precipitation of 18 per cent chromium, 8 per cent nickel corrosion-resisting steels. Metallographic examination shows various degrees of decomposition. Principally, the report will show effects of various reagents and indicate those which seem most satisfactory for detection of intergranular material.

Tentative specifications for corrosion-resisting chromium-nickel steels (sheet, strip and plate) (A 167) are to be recommended for adoption. Eight existing specifications for various types of chromium-nickel alloy steel castings already have been recommended for adoption. These include all castings except 12 to 14 per cent chromium group. This is being held as tentative pending consideration of adding another composition grade. Studies of test blocks for corrosion-resistant steel castings is contemplated for presentation in June.

Committee B-3 on Corrosion of Non-ferrous Metals and Alloys

A standardized method of salt-spray corrosion testing and a co-operative series of accelerated laboratory tests using the total immersion procedure in both aerated and nonaerated solutions was proposed. Corrosion data to be published in the 1939 B-3 annual report is expected to be of outstanding interest. In the co-operative accelerated laboratory test project, four different laboratories will carry out series of tests with the proposed method using six different kinds of metals in each of three different solutions (sodium chloride, sodium hydroxide and sulphuric acid). Results and details of test procedure should be available for the 1940 report.

In the study of galvanic and electrolytic corrosion, some 20 different metal combinations have been on exposure at nine different test locations for seven years. The report this year will include the results of inspection of these metal combinations at each test location after one, three and seven-year periods of exposure. Results of preliminary tests carried out on combinations of six different metals immersed in seawater also will be presented.

First work of the new subcommittee organized to develop specifications will probably deal with electroplated coatings on nonferrous metals. A paper on "Cleaning of Zinc Specimens Used in Corrosion Testing" will be presented.

Committee B-5 on Copper and Copper Alloys, Cast and Wrought

New specifications for leaded brass sheet and strip were approved for submission. Revisions in tentative specifications for sheet and strip phosphor bronze (B 103) will provide for the addition of a new alloy of leaded phosphor bronze. New specifications for copper-nickel zinc and copper-nickel sheet and strip were proposed also.

New specifications for beryllium-copper including requirements for sheet, strip, wire and rod were completed. Existing tentative specifications for copper-silicon alloy plates and sheets (B 96) and sheet copper-silicon alloy (B 97) also were recommended for adoption as standard. The two companion specifications which cover respectively copper-silicon alloy rods, bars and shapes (B 98) and copper-silicon alloy wire for general purposes (B 99) also were recommended for adoption as standard. Revisions were approved for immediate adoption in the standard specifications for naval brass rods for structural purposes (B 21).

Extensive revisions were developed in specifications for copper pipe, standard sizes (B 42) and due to the nature of the changes the revised specifications will be published as tentative. The standard specifications for seamless copper tubing, bright and annealed (B 68) are to be changed at several points and published as tentative. Specifications for seamless copper tubes (B 75) are to be revised to include material now covered in specifications for seamless copper boiler tubes (B 13) which will be discontinued. Important revisions were approved for immediate adoption in the specifications for copper water tube (B 88).

Extensive changes have been completed in the specifications for brass pipe, standard sizes (B 43) and the specifications as revised will be recommended for publication as tentative. Specifications for miscellaneous brass tubing are under preparation. New tentative specifications for copper and copper alloy forging rod were presented for publication to replace the existing specifications for brass forging rod (B 15), the latter to be withdrawn.

Tentative revisions of the specifications for manganese-bronze ingots for sand castings (B 7) and for manganese-bronze sand castings (B 54) were recommended for adoption in the specifications this year and a new revision was approved to provide for the inclusion in these two standards of requirements for a high-tensile-strength manganese-bronze alloy. New tentative specifications for nickel-silver casting alloys to cover four alloy compositions or grades were presented. To simplify preparation of specifications for copper-base casting alloys, consideration has been given to establishment of a classification or appropriate nomenclature for the groups of alloys. This has resulted in writing of a classification of the cast copper-base alloys for foundry purposes, recommended for publication as tentative this year.

A study is planned of procedures for the micrometer measurements of various copper products, particularly tubing and sheet and strip plate materials. Tapered-

pin method for testing copper tubing also is to be studied.

Committee B-6 on Die Casting Metals and Alloys

A change in tin and copper contents of alloy No. 2 in specifications for lead and tin-base alloy die castings (B 102) to provide an increased range of 80 to 84 per cent tin and 4 to 6 per cent copper, respectively, has been recommended. Samples of the five lead and tin-base alloys are available and will be tested for tensile strength by three laboratories. Creep tests will be run by two laboratories. Samples will be analyzed spectographically by several co-operating laboratories.

Speed and temperature of tension testing and the length of the impact test bar was discussed. A letter ballot on these matters is being canvassed to elicit views of various interests with results to be reported in June.

Exposure and corrosion tests on all of the zinc alloys on the test racks are completed with the exception of alloy No. 21. Data on these tests will be included in the 1939 annual report. Alloy No. 21 with a copper content of 2.5 to 3.5 per cent, aluminum 3.5 to 4.5 per cent, and the several aluminum alloys included in the tests are to be continued for at least 5 years, so total exposure will be at least 15 years.

Exposure tests will be started this year on new zinc and magnesium alloys, tests for physical properties and analyses have been made. In the specifications for magnesium-base alloy die castings (B 94), one new alloy designated as "13" has been proposed with the following suggested composition: Aluminum, 8.3 to 9.7 per cent; manganese, 0.013 minimum; zinc, 0.4-1.0; silicon, 0.5 maximum; copper, 0.05 maximum; nickel, 0.03 maximum; other (cadmium and tin), 0.3 maximum; balance magnesium.

Committee B-7 on Light Metals and Alloys

Revisions were recommended in two existing standards covering aluminum ingots for remelting and aluminum for use in the manufacture of iron and steel. These are to be reissued as tentative specifications. A new specification will be issued covering aluminum-base alloys in ingot form for die castings. The existing tentative requirements for magnesium ingot and stick for remelting (B 92) are to be balloted on for adoption as standard.

Revisions have been proposed in several existing specifications as follows: Aluminum-base alloy in ingot form for sand castings (B 58), and for permanent mold casting (B 112) (to limit analysis to elements listed unless the presence of others is indicated in routine analysis); aluminum-alloy sheet and plate (B 78), and aluminum bars, rods and shapes (B 89) (revise limits on sizes, source of material and mechanical properties to conform to present commercial practice); aluminum-magnesium-chromium sheet and plate (B 109) (add requirements for intermediate temper material and revise intermediate tempers respect to source of material); magnesium base alloy ingot for remelting (B 93) (add another die-casting alloy with composition conforming to limits selected by Committee B-6 on Die-Cast Metals and Alloys).

All aluminum and magnesium alloy specimens for inclusion in the speed-of-testing investigation have been prepared. Methods of testing anodic coatings is progressing. Methods of determining the abrasion resistance of such coatings are being given further attention and a report is expected for the June meeting of B-7. A method of testing the scaling characteristics of such coating thickness by the weight of oxide on a given area also is being investigated.

Committee C-8 on Refractories

Two new surveys, the first entitled "Conditions Surrounding Refractories Service in Continuous Plant and Window Glass Furnaces," and the second, "Industrial Survey of Conditions Surrounding Refractory Service in Lime Burning," have been prepared. Both have been approved by letter ballot and will be included in the annual report. These will supplement others covering open-hearth practice, malleable iron industry, copper industry, lead industry and by-product coke ovens.

Action was taken to submit to letter ballot for adoption as standard several specifications including tentative methods of test for cold crushing strength and modulus of rupture (C 133), the tentative standard (C 18), which covers methods of chemical analysis of refractory materials and also the definitions of 50, 60 and 70 per cent alumina-diaspore refractories which are covered in definitions of terms relating to refractories (C 71-37 T).

A revised procedure for testing high-temperature heat insulation to replace the existing methods (C 93) covering compression, flexure and shrinkage testing of this material was discussed and is to be approved as tentative this year. Since specifications for fire-clay brick for marine boiler service are not in general use, other specifications having superseded them, particularly one issued by the United States navy, they are to be withdrawn.

Specifications (C 49) covering quicklime and hydrated lime for the manufacture of silica brick are said to need revision so this will be discussed with Committee C-7 on lime which has jurisdiction over this specification. Since both Committee C-8 and Committee C-16 on thermal insulating materials are concerned with block insulation, a joint committee will recommend exact scopes of the two groups in this field so there will be no overlap. Committee C-8 has arbitrarily set about 1000 degrees Fahr. as the low end of the range in which it is interested, but since test methods used on block at higher temperatures are probably applicable to material used at lower temperatures it would appear that only one set of test methods should be seen.

Co-operative tests are being conducted in several laboratories on measuring the thermal conductivity of block insulation. Reports are not complete so final report will not be made until the fall of 1939. Standard apparatus is being developed for the determination of the thermal conductivity of refractories at elevated temperature.

Committee D-5 on Coal and Coke

Standardization of a testing procedure for determining the relative dustiness of either coal or coke was announced. Those procedures will permit evaluating the effectiveness of various treatments available for eliminating the formation of dust, often objectionable when handling solid fuels.

Another important project involves the development of a standard method for determining ignitibility of coal and coke. Agreement was reached on a definition of this property. Plasticity and swelling of coals for coke-making are being studied. Swelling of coals when fired on grates will be studied separately since this is a different problem from expansion during coking.

Committee E-2 on Spectrographic Analysis

Plans for symposium on fundamental methods and technique of spectrographic cussion will be condensed and correlated by the E-2 subcommittee on fundaanalysis at the annual meeting were considered. It is planned that the dismental methods and technique with the expectation that a more formal symposium will be held a year hence. The three existing methods of quantitative spectrochemical analysis (high-grade pig lead (E 25); zinc for lead, iron and cadmium (E 26); and zinc alloy die castings (E 27); will be continued but certain revisions and procedures are to be studied during the year.

Considerable interest had been shown in the publication "Index to the Literature on Spectrochemical Analysis," sponsored by the committee during the past year.

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Tin Alloys Toughened by Addition of Tellurium

■ Tin alloys containing up to 1 per cent tellurium recently have been investigated by Prof. D. Hanson and Dr. W. T. Pell-Walpole, both of the University of Birmingham, England. They find tellurium greatly improves creep strength of pure tin and in amounts up to 0.1 per cent effects some improvement intensile strength and brinell hardness. This disappears with heat treatment, however. Improvement in work-hardening capacity is notable in chill cast alloys, but not when there has been annealing prior to deformation.

A report of findings on this subject is contained in technical publication No. 81 of the International Tin Research and Development council, and copies may be obtained from the council, Fraser Road, Greenford, Middlesex, England.

Loads Transformers by Temperature of Copper

■ By developing a method of transformer operation by copper temperature rather than "maximum safe current," Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., claims to have discovered a means by which the power output of an electric locomotive can be increased for short periods by 50 to 100 per cent without dangerous overload. Method of utilizing this principle provides for tripping a relay that disconnects the load according to temperature of copper windings.

The device that responds to the copper temperature in the winding is an ordinary bimetallic strip, immersed in the same oil as the winding and carrying a current equal or proportional to that of the winding. An extreme movement of the bimetal, corresponding to excessive copper temperature, releases a mechanical latch that trips the circuit breaker and disconnects the load.

This method of operation has been applied to transformers ranging in size from small distribution units to substation transformers feeding an entire system.

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"WHEN our management demanded a further reduction in operating expense, we decided the saving had to come from maintenance costs," says this plant superintendent. "So we called in the Gulf engineer—and he is helping us secure the economies we need."

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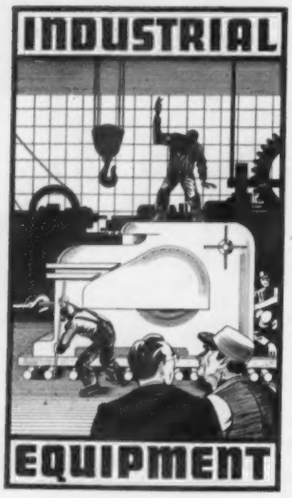
So we suggest that you ask this question of the Gulf engineer when he calls, "Can we make further operating savings through improved lubrication?" He can help you find the answer. Gulf Oil Corporation—Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

GULF INDUSTRIAL LUBRICATION



Cable Armoring Machine Made Up of Five Units

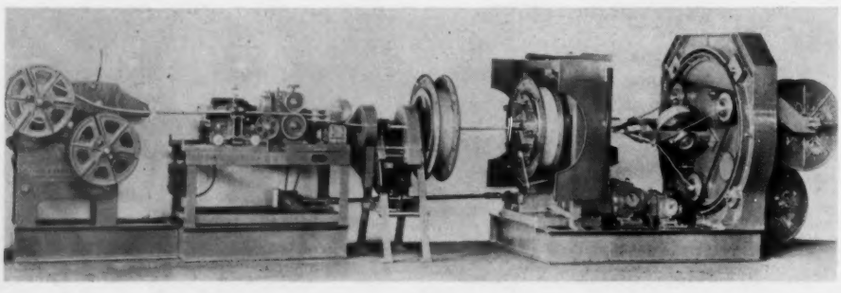
■ Sleeper & Hartley Inc., Worcester, Mass., has added to its line a cable armoring machine which is a combination of five separate units, as shown in the accompanying illustration.

Strander, or takeoff, consists of a rotating head, carrying two or three trunions, upon each of which is suspended a 30-inch spool of conductor wire. Head twists the several wires together. As wires proceed they enter a wrapping device and are wrapped with a continuous paper strip. Wires then pass through the armoring head, which coils around them a galvanized steel strip. The spooler, next unit in line, has a hollow spool spindle with rotating head and quick-release jaws. A double-screw traverse mechanism lays the desired width of strip stock.

Finished cable then reaches the measuring and cutoff unit. A trip cam connected to the cutting device is arranged with change gears for cuts of 100, 150, 200 and 250-foot lengths. The takeup, a 2-spindle unit, is equipped with 20 x 6 x 10-inch barrel collapsible spools with removable front flanges, and each spindle has an individual clutch. A cam-operated device covers complete range of cable diameters.

Complete machine is approximately 24 feet long. It is designed to operate for long periods with a minimum of tooling and handling.

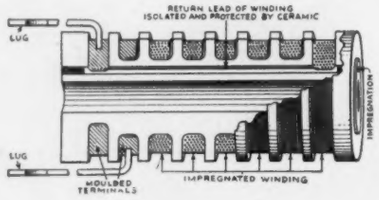
Arrangement of combination cable armoring machine, showing separate units. Wire enters at right end and passes successively through the strander head, spooler, cutoff and takeup



Precision Resistors Employ Special Wire

■ International Resistance Co., 401 North Broad street, Philadelphia, has added to its line three new precision wire-wound resistors in accuracies up to 1/10 of 1 per cent, employing a unique method of bringing both terminals out at one end, eliminating problems of shorting and breakage caused by exposed resistance wire.

Resistance wire is returned internally through the ceramic and

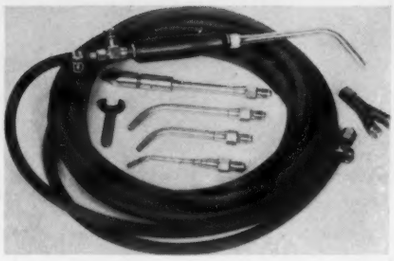


yet is insulated completely and protected from windings or mounting bolts. End leads are not exposed. Special alloy wire of ample size is used, wound on forms of non-hygroscopic ceramic. Windings are impregnated with a special varnish which improves insulation and eliminates breakdowns and shorted turns.

Introduces Outfit for Soldering Auto Bodies

■ The Linde Air Products Co., 205 East Forty-second street, New York, has introduced a Prest-O-Lite air-acetylene soldering outfit, developed primarily for automobile body work and designed for use with welding size acetylene cylinders or small medium-pressure acetylene generators.

Outfit includes four different size stems for fine, light, medium and heavy soldering and for brazing



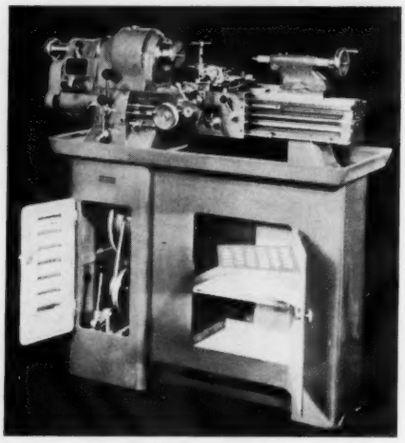
and heating. Also included is an enclosed-flame soldering copper for work in confined spaces where an open flame might damage adjacent materials.

Lathe Bed and Carriage Have Dovetail Design

■ Hardinge Bros. Inc., Elmira, N. Y., has introduced a precision ball bearing, highspeed toolroom lathe of a design intended to fill the gap between the plain precision bench lathe and the engine lathe.

Dovetail construction of carriage and bed holds carriage to the scraped ways, eliminating any lifting action. Positive locking of the carriage is provided by an eccentric lever, operating directly against the gib.

Spindle takes 1-inch capacity collets, and has a screw nose construction which permits interchange of collets, jaw chucks and face plates with 1-inch collet capacity precision



bench lathes. There are 16 spindle speeds from 26 to 1750 revolutions per minute. One lever gives instant forward-stop-reverse control of the power feed rod or lead screw, with the headstock continually operating in one direction. Another lever controls two speeds forward and two reverse, and when in its central position applies a mechanical spindle brake.

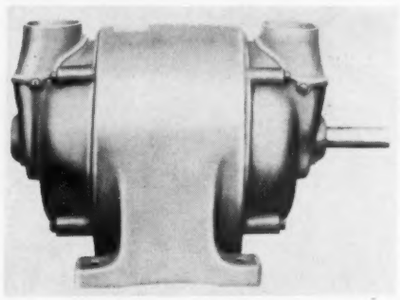
Tool post slide is mounted directly on the solid swivel base. Graduations on top the cross slide are read

through a wide opening in the swivel base. Cross slide has a travel of 4¾ inches. Apron is of the double-wall type with gears enclosed in chambers filled with grease. Hand feed wheel has a friction dial graduated in sixty-fourths of an inch.

Welded steel pedestal provides a modern support for this lathe. It fully encloses the motor, controls, driving unit and provides cabinet space for chucks, tools, collets, etc. Floor space required is 26 by 52 inches.

Pipe-Ventilated Motors Have Protected Windings

■ Sterling Electric Motors Inc., Telegraph road, Los Angeles, has announced a line of pipe-ventilated motors for process plants, foundries and other locations where moisture, dust and vapors are present.



These motors are totally enclosed. Foreign matter cannot enter the housing to damage windings. There are no clogged passages. Galvanized vent pipes are conveniently located out of the way. Motors are insulated with Mica-Bestos, which gives added protection to windings. Patented herringbone rotor is said to have good operating characteristics.

Inkless Recorders for Indoor and Outdoor Use

■ General Electric Co., Schenectady, N. Y. has announced a line of Type CF-1 inkless recording, single and double range alternating current ammeters and voltmeters.

Recorder gives continuous accurate operation for 30 days without attention at temperatures ranging from 10 to 120 degrees Fahr. Units are particularly suited for voltage surveys, complaint investigations and checking circuit load conditions. Inkless mechanism uses a typewriter ribbon, making the record by a series of dots. Cast aluminum alloy case of modernistic design protects the mechanism.

Voltmeters are listed for the double range of 0-140/0-280 volts.

Ammeters are for 0-5/0-10 amperes. The voltmeter is accurate to within 1½ per cent of full scale value over scale range normally used. Ammeters are accurate to within 3 per cent of full scale value.

Announces Cutoff Tool For Cutting Round Stock

■ Billings & Spencer Co., Hartford, Conn., has introduced a cutoff tool to be used for cutting drill rod, wire or smaller diameters of bar stock. This tool, it is claimed, will cut off drill rod and wire from 0 to ¼-inch round inclusive without leaving a burr.

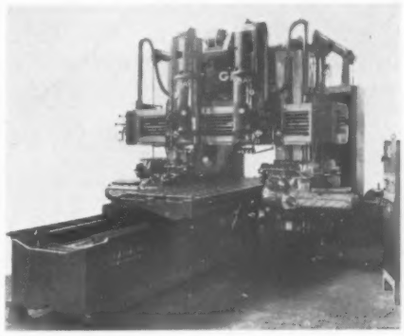
It is fast in action, easy to operate and requires a minimum of exertion since it is designed to utilize directly the leverage applied. It can be secured to a workbench permanently or can be set up in a vise in a short time. The tool is drop forged, carefully machined, and properly heat treated.

Bar is 15¾ inches long, ⅞-inch diameter and is finished in a gray finish with bright red end. Cutoff cam and block is in a natural rustproof finish. List price is $3.75.

Milling Machine Heads Driven Independently

■ G. A. Gray Co., 3611 Woodburn avenue, Cincinnati, recently announced a unit head type milling machine, said to combine the speed, flexibility and ease of control found in small knee type millers with the power, rigidity and accuracy of planer type machines.

Milling heads are individual units, each driven by its own self-contained motor. Standard spindle motor is of the alternating current, two - speed, 10 - horsepower type, mounted concentric with the spindle. Power is transmitted directly to the spindle through planetary gearing. There are 18 spindle speeds, ranging in geometric progression from 10 to 500 revolutions per minute. Spindle runs in Timken bearings and is driven by a planet carrier at a point close to the cutter, thus eliminating all driving gear side strain.



Standard quill travel of both rail heads and side heads is 10 inches. Milling feeds range from ½-inch to 30 inches per minute. Range of down feed and up feed of rail heads is from ⅛-inch to 7½ inches per minute.

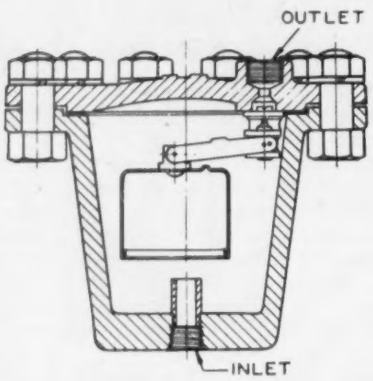
Bed is of double-length type so that table does not overhang, even when center line of either vertical or horizontal spindle is at the extreme working length of the table. Table ways run full length of the table, thus giving maximum ratio of length to width of guide.

Announces Steam Traps Of Inverted Bucket Type

■ Sarco Co. Inc., 183 Madison avenue, New York, has developed steam traps of inverted bucket type for pressures up to 900 pounds per square inch. Traps are suitable for superheated steam of any commercial temperature.

Body and cover are high grade

steel forgings of a shape to give maximum strength. Special alloy steel bolts are used for attaching



cover to body. All interior parts, including bucket, are of stainless steel. Special hardened stainless alloy is used for renewable valve seat and disk.

Smokestack Protector Has Simple Construction

■ J. T. Cullen Co., Fulton, Ill., has devised a protector for weatherproofing smokestacks. Protector consists essentially of one Venturi tube, two conical sections and a circular guard band. Venturi tube increases the natural draft. Conical sections acts as a watershed, while another conical section inverted below and fastened to the former serves to spread the products of combustion to the atmosphere. Circular guard band prevents elements entering interior of the stack from the side.

Protector is made of copperbearing steel. It protects smokestacks from the elements and is said to eliminate the ravages of sulphuric

acid. It prevents dangerous downdraft and stimulates natural draft. As an efficient spark arrester, it reduces fire hazard.

Air-Motored Agitator Handles Heavy Materials

■ Eclipse Air Brush Co., Newark, N. J., has added another mixer, Type D, to its line of Pnewmix air-motored agitators.

Air motor drives through gears having a ratio of 40 to 1. Motor and gear assembly is detachably mounted on a spider type platform, adjustable to diameters from 12 to 26 inches to fit 5 to 55-gallon drums. Standard chromium plated steel shaft is from 12 to 27 inches long. Propellers are supplied in two types: 8-inch, six-bladed turbo type; or 10-inch, two-bladed airplane type.

Air consumption with agitator

running free is 5 cubic feet at 150 revolutions per minute and 11 cubic feet at 400 revolutions per minute. Unit is safe in operation, and is suitable for mixing varnish and lacquer, stirring saponified nitroglycerine, agitating TNT, etc.

Introduces New Series Of Counting Machines

■ Durant Mfg. Co., 1924 North Buffum street, Milwaukee, is offering a series of counting machines, including stroke and revolution counters, in twenty variations to fit any industrial application.

Counters have dust-tight metal covers with dark gray crackle finish. No maintenance is required, as all shafts run on oilless bearings. Louvered windows and all metal number wheels with large black figures on white background make easy reading of count at some distance from counter.

These counters, known as series H Productimeters, are available in stroke or rotary models; nonreset, wing nut reset or tumbler lock reset; operating levers on left or right; shaft extensions on left or

right or both ends; five or six figures; rotations clockwise or counter-clockwise. Unauthorized resetting of count is prevented, where desired, by models carrying tumbler locks permanently fitted to the shaft.

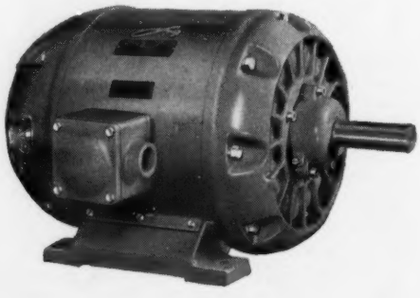
Air Hose Has High Pressure Resistance

■ United States Rubber Co., Mechanical Goods division, 1790 Broadway, New York, has developed a Super Royal Cord air hose for severe service conditions such as those encountered in mining work and where hot oil conditions exist.

Hose has a high grade synthetic rubber tube and a tan gum cover, bonded together by an improved method. Body is of cord tire construction and has more than ample pressure resistance.

Streamlined Motors Are Explosionproof

■ Louis Allis Co., 427 East Stewart street, Milwaukee, has announced a new line of alternating and direct current explosion-proof motors, designed to operate in oil refineries, chemical factories, dry cleaning plants, lacquer and paint factories and similar places where explosive materials are manufactured or



handled. Besides safety, this new line of motors features a complete re-design, which incorporates the latest trend in industrial streamlining.

Annealing of Bolt Stock Is Carefully Controlled

(*Concluded from Page* 64)

tensile bolts, since decarburization forms on the surface of the steel and adversely affects threaded section which carries the tensile stress. Products of the new furnace suffer no total decarburization, and partial decarburization is held at a maximum of 5 thousandths, see Fig. 6. This applies to bolt stocks only.

Heating the steel very rapidly is one method of overcoming excessive decarburization in the oxidizing atmosphere of other types of furnaces. This causes a coating of scale to form on the surface which serves as an insulation around the metal. However, this practice often results in a badly pitted surface which carries through to the bolt and is objectionable to critical bolt buyers. This new furnace, with its non-oxidizing atmosphere, produces a clean, almost scale-free surface that is readily cleaned in the pickling process without danger of pitting.

Gas Association Embarks On Study of Processes

■ Metal cutting and welding with city gas-oxygen torches, recent advances in use of prepared gaseous atmospheres, and new heat treating processes which have come over the horizon in the past year, are three subjects singled out for study and analysis during 1939 by the ferrous metals committee, industrial gas section, American Gas association, at a recent New York meeting. New chairman of this group, which acts in behalf of improved applications of gas to the iron and steel industry's heating jobs, is Clayton C. Conkright, Public Service Electric & Gas Co. of New Jersey.

Paramount in the committee's mind this year will be economic considerations involved in use of city gas in the three fields. Actual cost studies of numerous applications will be made. Several and frequent interim bulletins will be issued to disseminate useful data.

Most likely the first in the committee's series of bulletins, it is reported, will concern cutting and welding with gas—not a new use for city gas, but one in which interest has revived noticeably of late, and one which has never been fully capitalized upon by the metal industry. New standards of economy, it is claimed, are being established in the use of city gas-oxygen torches, particularly for scarfing, scaling and deseaming.

Studies of prepared gaseous atmosphere units will cover all types of equipment for generating from city gas both protective atmospheres and process atmospheres. Apparatus by American Gas Furnace Co.; C. M. Kemp Mfg. Co.; Surface Combustion Corp.; Mahr Mfg. Co.; General Electric Co.; Westinghouse Electric & Mfg. Co.; Sentry Co.; Lithium Corp. of America; Electric Furnace Co.; and J. P. Devine Mfg. Co., will be considered both functionally and economically.

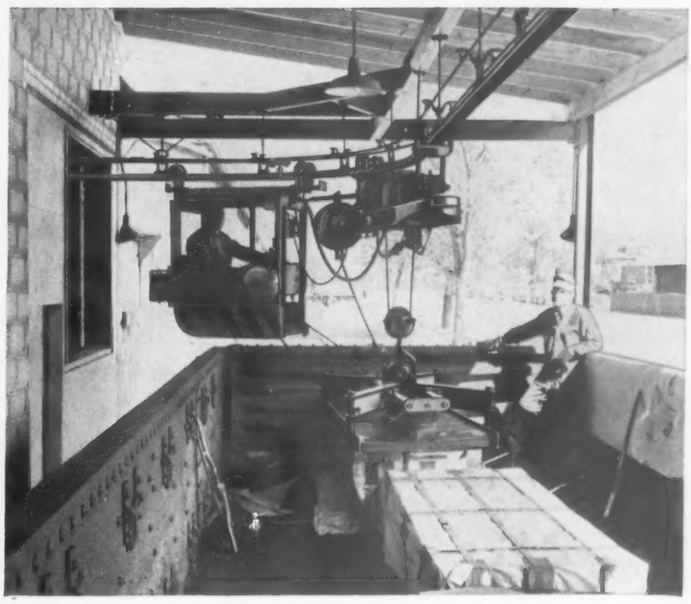
New heat treating processes to be reported upon include: Air furnace heating, cyaniding in gas atmospheres, and high speed steel units, all of which perform their work with decarburization.

Soap Aids Wet Working Of Copper and Brass

■ A new powdered soap for wet working copper and brass has been developed by National Oil Products Co., Harrison, N. J. Known as Nopco Soap L, this product is highly concentrated and is said to be clean, white, odorless and resistant to rancidity. It is recommended for use in drawing or stamping copper and brass shells, drawing coarse yellow brass wire, intermediate yellow brass tubes and coarse, hard bronze wires.

CLEVELAND TRAMRAIL

OVER HEAD HANDLING EQUIPMENT



● Among the many applications of Cleveland Tramrail Overhead Handling equipment, one of the most widely applied is Handling of Metal Sheets—Black—Galvanized—Cold Rolled. All types are handled from cars to storage or production line with safety and at cost savings which will surprise you.

ALSO BUILDERS OF CLEVELAND CRANES ALL WELDED

CLEVELAND TRAMRAIL

DIVISION OF

THE CLEVELAND CRANE & ENGINEERING CO.

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Or Consult Your Phone Directory under Cleveland Tramrail

Modern Steel Strapping Simplifies Packaging

(*Continued from Page* 60)

2 costs more, there is a definite saving to the receiver who quickly removes the straps and handles each of the 12 bundles as a unit. This has made it possible to cut unloading time approximately 75 per cent. In addition the disks with their wrapping of water-proof paper are completely protected during shipment as well as in subsequent storage.

Fig. 3 shows how cold drawn steel rods are loaded to make a most economical shipment. The illustration reveals a half-car unit of ten 2500-pound skid loads. Previously these loads were shipped loose in the car and held in place with heavy timber bracing. Now the receiver unloads 2500 pounds of rods at a time as this is the amount bundled into one skid load which is easily handled by one man with a power truck. After being loaded in the car, the ten skid loads are fastened together as a unit, using steel bands around the entire assembly as shown in Fig. 3.

While no actual cost figures are available on this application it is understood that unloading time was cut about 80 per cent and that both shipper and receiver are extremely pleased with the increased safety obtained with the new method.

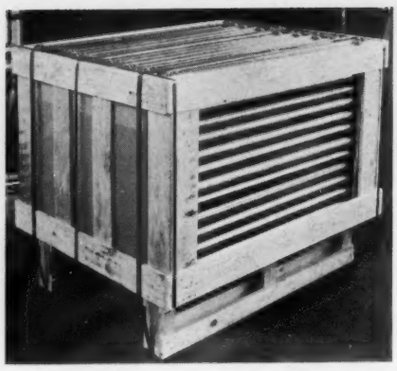


Fig. 6—Skidload of mechanic's universal joints, crated and steel strapped for shipment

Fig. 6 illustrates a similar application of the unit skid idea to a product which was similarly shipped loose in cars. The savings in handling costs and possible damage claims, as well as the increased safety factor, are obvious.

Fig. 7 is of interest because it illustrates how a product which appears extremely awkward to load has been handled successfully. These bent rods or cranks formerly were shipped loose and handled in bundles of five or ten. When bundled as shown in Fig. 7, one man with a power truck easily handles a skid load of several hundred of these formed bars.

Another important development of comparatively recent date is the steel strapping of structural shapes for shipment. Figs. 4 and 5 show

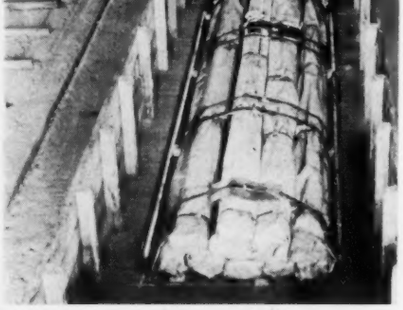
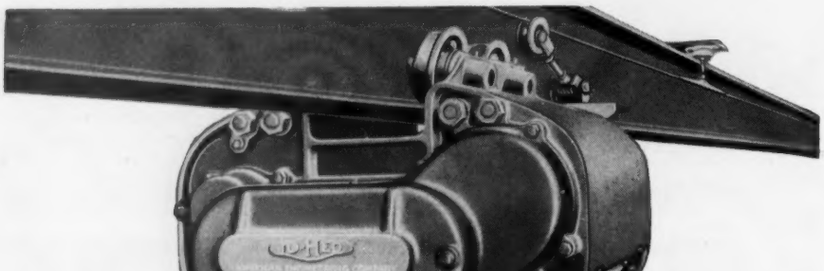


Fig. 8—Alloy steel rods are bundled with waterproof paper covering and braced as a unit in the car, eliminating tarpaulins



For Short Hauls use the PLAIN TROLLEY TYPE A-E-CO LO-HED HOIST

The *plain trolley type* A-E-CO Lo-Hed hoist—the one you can pull along the rail—is the sensible choice under these conditions:

1. When the haul is short and the load not too heavy. 2. When the path under the hoist is walkable. 3. When the haul is long but seldom repeated. 4. When time is no great factor. For details of this and all other Lo-Hed hoists, send for our new catalog today.

AE CO POINTS

- Available in capacities of 1/4 to 6 tons.
- Operates on Standard I-beams or track of any make.
- Low headroom—stacks materials higher than any other hoist.
- Safe, fool-proof.
- Compact, strong, simply constructed.
- Exceptionally low maintenance.
- Protected against dust, moisture, fumes.
- Heavy duty, ball-bearing HOIST motor.
- Automatic lowering brake.
- Ball or roller bearings at vital points.
- Improved plow-steel cable.
- 100% positive automatic stop.
- Efficient spur-gear drive . . . and

LO-HED COSTS LESS PER LIFT

OTHER A-E-CO PRODUCTS: Taylor Stoker Units, Marine Deck Auxiliaries, Hele-Shaw Fluid Power.

A-E-CO Lo-Hed HOISTS

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

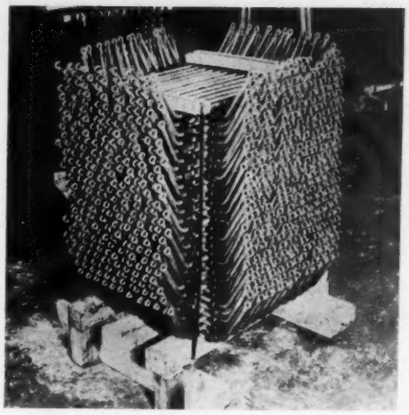


Fig. 7—Skid load of several hundred formed bars handled as a unit with inexpensive wood crate and steel straps

typical jobs where efficiency of handling was greatly increased by satisfactory strapping methods. In Fig. 5 the shipper advises that costs have been reduced between 40 and 50 per cent in loading and handling this material, long pieces of large angle sections. A similar saving is reported by the consignees who have commented most favorably on the progressive step taken by the shipper in thus "packaging" his shipments.

This strapping of structural shapes promises to be a field of great interest and it is expected that this method will receive rapid expansion in the coming months. There are possibly three important advantages obtained by use of steel strapping methods in handling of structural shapes. In the first place, heavy timber bracing formerly necessary is entirely eliminated. This reduces tare weight, in turn reducing shipping costs and making for more

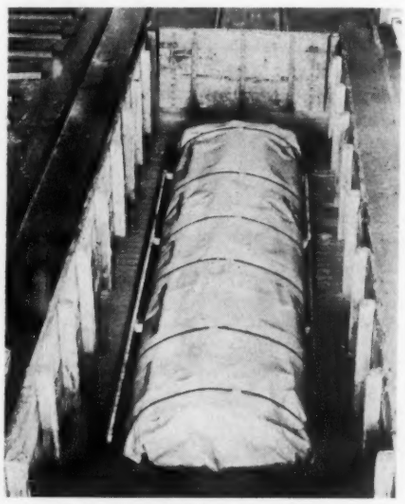


Fig. 9—If further protection is desired, the entire unit can be wrapped again and banded as shown here, assuring most complete protection

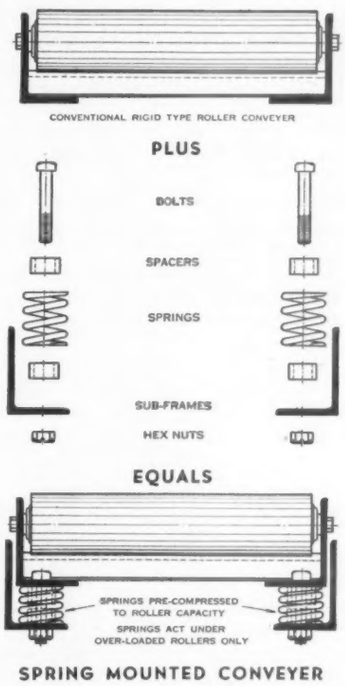
MATHEWS

SPRING MOUNTED CONVEYERS

WHY . . . . to lower maintenance costs.

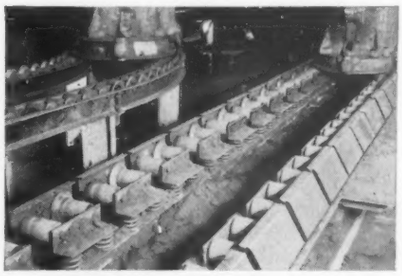
WHERE . . . where the service is abusive to rollers, bearings, and axles.

WHEN . . . for new installations or to replace old equipment.



SPRING MOUNTED CONVEYER

Mathews Spring Mounted Conveyers are Protected by United States Patents Nos. 1,518,836; 2,077,188; 2,077,189; 2,077,190; 2,107,822 and Other Patents Pending.



CAUSE AND EFFECT

THE principle is simple; the roller axles are rigidly locked in the frame as in the conventional "rigid type" construction, but the conveyer frame which retains the rollers is carried on pre-compressed coil springs, the springs held in compression equal to the rated safe load of each roller. Under impact conditions or excessive loads the springs absorb the overload.

In pioneering this development Mathews Engineers have made available to industry nine sizes which cope with the majority of applications.

TYPE 33, Rollers 1⅝", 1.9", 2¼", 2½" diameters, 150 lbs. capacity per roller.

TYPE 53, Rollers 2⅜", 3½" diameters, 600 lbs. capacity per roller.

TYPE 58, Rollers 3½" diameter, 2000 lbs. capacity per roller.

TYPE 63, Rollers 4¼" diameter, 4000 lbs. capacity per roller.

TYPE 110, Rollers 5" diameter, 8000 lbs. capacity per roller.

Ask for Data Sheet 24-A & B. It contains complete engineering data The book "Equipping Industry for Continuous Production" illustrates installations. Both items sent upon request.

MATHEWS CONVEYER COMPANY

142 TENTH STREET, ELLWOOD CITY, PENNA

CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

efficient use of shipping facilities.

The second important advantage is the fact that use of steel bands permits forming the material into bundles which can be handled quickly and easily by means of standard handling equipment such as cranes, industrial lift trucks, etc.

Another important feature is that the steel band method of bracing reduces damage claims. This results from elimination of all movement of the material during shipment, preventing motion of the car from causing material to move about during shipment.

Fig. 4 shows flat strip steel braced in bundles and securely anchored in a car. This affords an easy method of handling large quantities of such material in unit packages, thus greatly facilitating loading operations. Also these unit packages are easily anchored in the car against movement during shipping. Many similar applications of this method to other structural shapes are possible of course.

Strapping Is Protection

Still another important application of steel strapping methods is seen in the protection so easily incorporated in steel strapped bundles. Figs. 8 and 9 show alloy steel rods wrapped in bundles with a heavy water-proof paper covering also applied to protect the metal from the weather. These individual bundles are then assembled into one large unit in the car and braced with bands to effect safe delivery.

Loading time was reduced from 16 to 4 man hours. Saving in lumber alone amounted to $40.00 per car, for the shipper.

Where shipments are made up for export, additional protection is sometimes provided as shown in Fig. 9 where the large group of bundles is again wrapped in water-proof paper held in place by steel straps. This forms a second protection definitely assuring safe delivery of the product even in open freight cars in the worst type of weather. These large groups of bundles, as shown in Figs. 8 and 9, may or may not be fastened down onto skids. However, the use of a skid platform with the bundles tightly fastened to it forms a most secure package and one that can easily be handled by cranes using cable slings.

Machines Create, Not Destroy, Employment

(*Concluded from Page* 26)

noted that parts produced by the different methods of finishing may have identical measurements with some of these devices but they may vary considerably in appearance.

The bright and highly reflective surface finish, regardless of the manner in which it is produced, is not necessarily in all instances the most accurate with respect to surface flatness or dimension.

The grinding wheel has a rather small area of contact with the work, and in this respect grinding differs from other abrasive finishing operations. For example, in honing or lapping the abrasive element has in comparison a much greater area of contact. The scratches produced are of much greater length than those produced in grinding and cross each other in places.

Technique of Grinding

In grinding, the abrasive element or wheel makes only a line contact in engaging the work. The rapidly revolving wheel causes the small grain particles of the wheel to remove minute chips from the work. This results in producing a finish with the characteristic appearance of microscopic parallel scratches adjoining each other throughout the ground surface. These scratches are rather short. Their length is variable by altering the relationship of the work speed with the wheel speed. The size and depth of these scratches and consequently the appearance of the finish ground surface can be varied considerably by selection of grinding wheels having different grain size or bonding material.

During the grinding operation it is inherently necessary to remove enough stock from the work to be sure the finished part will be cleaned up all over or ground on all the surface intended to be ground.

A coarse grain grinding wheel will remove this grinding stock from the work much faster than a finer wheel. But a finer grain wheel, when kept properly dressed, will produce the best finished surface on the work. The fine grain wheel however will not under normal conditions, cut as fast as the coarser wheel.

Thus, the problem is whether to grind parts with a coarse wheel at a high rate of production, and obtain only a fair finish, or to grind with a finer wheel at a slower rate of production and obtain a much better surface finish. Usually a compromise between the two is made.

If the parts under consideration require an exceptionally smooth surface finish, we may then consider the advisability of rough and finish grinding; using the coarser wheel for rapidly removing the stock to a size close to finish size, and following this with a much finer wheel with light cuts to obtain the desired size and smooth surface finish. With proper selection of wheels, wheel speed, surface speed of the work and traverse or feed, an exceptionally good surface finish can be obtained. Production and cost of work so produced compares favorably with other methods.

The subject of superfinishing (STEEL, Sept. 26, p. 36) was reviewed briefly by D. A. Wallace, president Chrysler division, Chrysler Corp., Detroit, who is primarily responsible for the perfection and commercial adaptation of this new method of abrasive finishing to a smoothness measured in a few millionths of an inch.

Measurement of surface irregularities of this minute character is usually accomplished with the aid of the profilometer, an instrument developed by Dr. Ernest Abbott, president, Physicists Research Corp., Ann Arbor, Mich., who contributed to the symposium with a discussion of the application of his precision equipment in measurement of various types of surfaces.

Honing was the topic of a paper by Kirke W. Connor, president, Micromatic Hone Corp., Detroit, (STEEL, Aug. 8, 1938, p. 36). Lapping methods were reviewed by H. J. Griffing, sales research engineer, Norton Co., Worcester, Mass. Diamond boring and finishing were elaborated upon by F. T. Ellis, Heald Machine Co., Worcester, Mass.

A.S.T.M. Issues Index on Spectrochemical Analysis

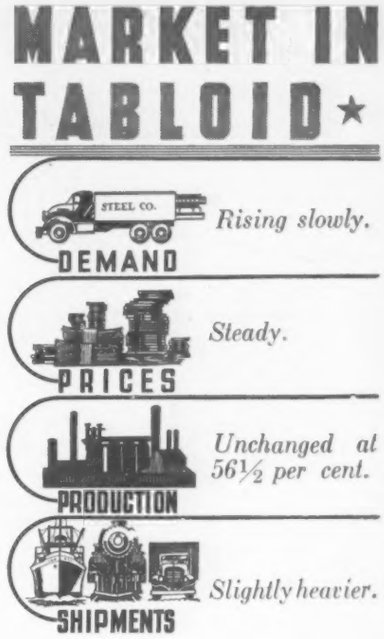
■ "Index to the Literature on Spectrochemical Analysis, 1920-1937" is the title of a 62-page booklet just published by the American Society for Testing Materials. Based on work which has continued over many years in the spectroscopy section of the national bureau of standards, Washington, this publication, the information for which was compiled by W. F. Meggers and B. F. Scribner of the bureau, contains a listing of over 900 references on chemical analysis by means of atomic emission spectra.

While various reviews in the past have given references to particular applications, this is the first general comprehensive index to spectrochemical literature. All items are arranged in chronological order with titles given in English (book titles have not been translated, however). References to published abstracts are given. Of particular interest is the detailed index which indicates most, if not all, of the literature pertaining to a particular application, determination, instrument, method or similar topic. Each reference is numbered, these numbers being used in the index.

Copies of the publication in heavy paper binding can be obtained from the American Society for Testing Materials, 260 South Broad street, Philadelphia, for $1 each.

Increase In Steel Activity Gradual

Production Lagging But Consumption Tends Upward



■ STEEL demand continues to improve slowly, but gains are spotty and somewhat less than had been expected.

Ingot production showed divergent trends in the different centers last week, leaving the national average unchanged at 56½ per cent. Finished steel consumption still is expanding, however, and the outlook is favorable for further gains in operations before attainment of the first-half peak. A year ago steelmaking was at 32 per cent.

Moderate quickening in railroad equipment markets and the third consecutive weekly gain in automobile production are favorable developments among major steel users. An upturn in sales by warehouses in most districts attests to rising requirements of smaller consumers.

Motorcar assemblies have moved back to the highest level in seven weeks, reflecting recent expansion in retail buying, but steel orders from this industry are restricted to relatively small lots. The rising trend is expected to carry into April. Last week's production of 86,725 units compares with 84,095 the week before and 57,555 a year ago. Chrysler accounted for most of the increase, assembling 20,570 units against 16,200 the previous week. General Motors increased from 36,165 to 36,515, Ford dropped from 20,425 to 17,950 and all others increased from 11,305 to 11,690.

Purchase Of 8000 Freight Cars Shortly In Prospect

Only a few rail orders are pending, including 4000 tons for the Nickel Plate, but some additional business will be forthcoming from roads not yet heard from this year. Further improvement in traffic and earnings is counted on to stimulate buying of both track material and equipment. Probable freight car purchases before the middle of the year number 8000, it is estimated from inquiries and contemplated orders.

Lehigh Valley has placed 500 hopper cars and ten coaches. Denver & Rio Grande Western is a prospective buyer of 600 freight cars. The Milwaukee road has ordered six diesel switching locomotives, while the Rock Island has awarded two streamlined passenger trains, including diesel-electric locomotives.

Bookings of fabricated structural shapes generally continue small, one exception being 3000 tons for a power plant, Oswego, N. Y. A fairly large tonnage is pending, although private construction is improving only gradually. Outstanding among recent inquiries is 10,000 tons for a Raritan river bridge in New Jersey. Concrete reinforcing bars continue active in some districts, principally because of public works projects. At Chicago 2450 tons of bars has been placed for a subway section, with 3650 tons pending for another unit.

The largest single order for cast iron pipe in many months involves 16,000 tons for Greenville, S. C., awarded to American Cast Iron Pipe Co.

Pig Iron Shipments And Orders Gaining Slowly

Foundry operations show only minor changes, but pig iron orders and shipments both are tending upward. All producers now have reaffirmed current prices on second quarter business.

Finished steel prices also have been established for the next period, generally at unchanged levels except for what minor revisions result in net quotations as a result of new quantity differentials for bars, sheets and strip. Cold-finished bars out of warehouse have been reduced $5 a ton in a number of centers.

Steelmaking rose 2 points to 50 per cent at Pittsburgh last week, but Chicago slipped 1½ points to 56½ per cent, following six consecutive weekly increases. Youngstown also was up 2 points to 54 per cent, Cleveland increased 2½ points to 54½, while Cincinnati recovered 12 points to 55. Birmingham dropped 5 points to 78 and Wheeling was off 1 point to 73. Buffalo advanced 1 point to 33½.

Other districts were unchanged, including eastern Pennsylvania at 40, Detroit at 76, New England at 65, and St. Louis at 57½.

Scrap continues strong but rather quiet as regards mill buying in most areas. The scrap composite is unchanged at $14.96 for the third week. The finished steel composite holds at $56.50.

—The Market Week—

COMPOSITE MARKET AVERAGES

	Mar. 18	Mar. 11	Mar. 4	One Month Ago Feb., 1939	Three Months Ago Dec., 1938	One Year Ago Mar., 1938	Five Years Ago Mar., 1934
Iron and Steel	$36.39	$36.39	$36.38	$36.37	$36.36	$38.80	$31.38
Finished Steel	56.50	56.50	56.50	56.50	56.50	61.70	51.10
Steelworks Scrap..	14.96	14.96	14.96	14.87	14.77	13.20	12.30

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	March 18, 1939	Feb. 1939	Dec. 1938	March 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.45
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	March 18, 1939	Feb. 1939	Dec. 1938	March 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	85.27	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.65	$15.50	$13.65
Heavy melt. steel, No. 2, E. Pa.	13.25	13.25	13.20	12.75
Heavy melting steel, Chicago	14.25	14.00	13.85	12.20
Rails for rolling, Chicago	17.25	17.25	17.75	15.25
Railroad steel specialties, Chicago	16.25	16.00	16.05	14.25

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.80; two-point cattle, 80-rod spool	$2.62
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

Alloy	Diff.	Alloy	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 150-4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(*Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	65-5	70
⅝-1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers	
and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

⅜	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50
Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$60.80
First Quality	
Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50
Second Quality	
Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00
Ohio	
First quality	39.90
Intermediate	36.10
Second quality	31.35
Malleable Bung Brick	
All bases	$56.05
Silica Brick	
Pennsylvania	$40.00
Joliet, E. Chicago	49.00
Birmingham, Ala.	40.00
Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry press	$28.00
Wire cut	$26.00
Magnesite	
Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00; Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40

Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do, less-ton lots 2.30

Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05; Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do, 2% 12.50c

Spot ¼c higher

Silicon Briquetes, contract, carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c

Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.61
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.33
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.00

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars: 2300	3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.11	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.60	3.58	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.39	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.85	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.50	4.65	9.40	8.55	8.40	9.05	10.40	9.56
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, March 16

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.45 5 0 0	$17.25	2 0 6
Basic bessemer	.....	16.40	1 18 6
Hematite, Phos. .03-.05	26.97 5 15 0*	.....	.....
Billets	$34.59 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.35 11 7 6	42.60	5 0 0
Standard rails	$44.56 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.90c to 2.05c	4 17 6 to 5 5 0
Structural shapes	2.09c 10 0 0	1.85c to 1.90c	4 15 0 to 4 17 6
Plates, †¾ in. or 5 mm.	2.29c 10 18 9	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm	2.72c 13 0 0	2.93c	7 10 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.61c	9 5 0
Bands and strips	2.77c 13 5 0	1.95c	5 0 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	.....	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73 1 0 3	.....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.22	4 19 0(a)	$17.44	620.50	$15.67	465	$25.29 63
Basic bess. pig iron	21.69	4 12 6(a)	.....	...	.....	...	27.90(b) 69.50
Furnace coke	5.39	1 4 2	5.96	225	7.25	215	7.63 19
Billets	34.59	7 7 6	25.04	945	28.98	860	38.74 96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c 132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c 110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c 127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.61c	17 5 0	3.12c	2,600	4.13c	2,750	6.66c 370
Plain wire	4.08c	19 10 0	1.92c	1,600	2.48c	1,650	3.11c 173
Bands and strips	2.58c	12 7 0††	1.71c	1,340	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	14.00-14.50
Chicago, auto, no alloy	12.50-13.00
Chicago, No. 2 auto	11.50-12.00
Cincinnati, dealers	12.00-12.50
Cleveland, No. 1	14.00-14.50
Cleveland, No. 2	13.00-13.50
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.00- 9.50
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	11.75-12.25
Granite City, R. R.	12.25-12.75
Granite City, No. 2	11.00-11.50
Los Angeles, No. 1	12.50-13.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.50-17.00
Pittsburgh, No. 1	15.75-16.00
Pittsburgh, No. 2	14.75-15.25
St. Louis, R. R.	12.25-12.75
St. Louis, No. 2	11.00-11.50
San Francisco, No. 1	12.00
Seattle, No. 1	12.00
Toronto, dirs. No. 1	9.50- 9.75
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	13.00-13.50
Chicago, dealer	12.00-12.50
Cincinnati, del.	11.25-11.75
Cleveland	14.00-14.50
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.75-16.00
St. Louis	10.00-10.50
Valleys	14.50-15.00

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.75-15.25
St. Louis	7.50- 8.00
Toronto, dealers	3.50

SHEET CLIPPINGS, LOOSE

Chicago	10.50-11.00
Cincinnati, dealers	7.25- 7.75
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	8.25- 8.75
Cincinnati, No. 2	3.75- 4.25
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	14.25-14.75
Toronto, dealers	4.00- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	6.75- 7.25
Cincinnati, dealers	5.00- 5.50
Cleveland	7.50- 8.00
Detroit	6.00- 6.50
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.75-10.25
St. Louis	3.00- 4.00
Toronto, dealers	4.00- 4.50
Valleys	9.50-10.00

SHOVELING TURNINGS

Buffalo	7.25- 8.00
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.75- 7.25
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.00- 7.25
Cincinnati, dealers	3.50- 4.00
Cleveland	8.00- 8.50
Eastern Pa.	6.50- 7.00
Detroit	6.25- 6.75
New York	†2.50- 3.00
Pittsburgh	8.75- 9.00
Toronto, dealers	5.00- 5.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	14.00-14.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.50-10.00
Toronto	4.25- 4.50

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.50- 8.00
Chicago	6.00- 6.50
Cincinnati, dealers	3.50- 4.00
Cleveland	8.00- 8.50
Detroit	6.25- 6.75
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	4.00- 4.25

RAILROAD SPECIALTIES

Chicago	16.00-16.50

ANGLE BARS—STEEL

Chicago	16.00-16.50
St. Louis	13.75-14.25

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	15.75-16.25
Eastern Pa.	17.00-17.50
Pittsburgh	18.00-18.50
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	16.50-17.00
Chicago (2 ft.)	17.00-17.50
Cincinnati, dealers	17.00-17.50
Detroit	17.00-17.50
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.25-18.75
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	17.00-17.50
St. Louis	13.75-14.25
Seattle	16.00

FROGS, SWITCHES

Chicago	14.00-14.50
St. Louis, cut	13.75-14.00

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.00- 9.50
Cincinnati, dealers	7.25- 7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.25- 7.75
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
St. Louis	9.00- 9.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	10.00-10.25

FORGE FLASHINGS

Boston district	†8.50
Buffalo	12.00-12.50
Cleveland	12.00-12.50
Detroit	10.50-11.00
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	19.00-19.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.50-17.00
Eastern Pa.	17.50-18.00
Pittsburgh	18.00-18.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	16.50-17.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00-16.50
Chicago, net	18.00-18.50
Eastern Pa.	21.00-21.50
St. Louis	18.00-18.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†15.25-15.75
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.50-18.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	18.00-18.50
St. Louis, iron	14.50-15.00
St. Louis, steel	14.50-15.00

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†10.50-10.75
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	13.00-13.50
Chicago, rail'd net	11.50-12.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	14.00-14.50
Cleveland, mach.	17.00-17.50
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.00-13.00

HEAVY CAST

Boston dist. break.	†9.75
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break.	10.00-10.50
Eastern Pa.	15.00-15.50
Los Ang., auto, net	13.00-13.50
New York, break.	†10.50-11.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.00- 8.50
Cincinnati, dealers	7.25- 7.75
Detroit, net	8.00- 8.50
Eastern Pa.	13.00-13.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.50-16.00
Cincin., agri. deal.	12.50-13.00
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.00-15.50
St. Louis, R. R.	12.25-12.75

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten. sh. ton. unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

Sheets, Strip

Sheet and Strip Prices, Pages 78, 79

Pittsburgh — Gradual improvement in sheet buying is reflected in small gains in mill operations. Specifications are up moderately, coming principally from fabricators of building material and household equipment, with some from automotive interests. Sheet and strip business from the latter has been fairly consistent but includes no outstanding tonnages. Demand for wider sizes of cold-rolled strip is a little better, while narrower widths are being taken in greater volume by users for further manufacture. Both hot and cold strip mill operations are about 40 per cent, with black sheet output at 45 and galvanized at 60.

Cleveland—Business is improved slightly over levels prevailing earlier in the year, despite absence of any marked upturn in automotive demand. Most gains have come from a diversified list of miscellaneous consumers. Price extensions have had little effect on orders, with consumers restricting both forward purchases and inventories.

Chicago—Sheet and strip demand is slightly heavier, with moderate improvement noted in automotive orders, but the betterment has not been broad. Some producers look for no marked expansion in automotive requirements soon. Buying generally is for early needs.

Boston — Hoped-for improvement in narrow cold strip buying has not materialized, incoming tonnage being barely maintained, with finishing operations generally at 50 to 60 per cent, the inside figure being the more representative. Re-rolling schedules are irregular with no backlogs, production being based on day-to-day orders, which are for prompt delivery.

Sheet orders are slightly heavier, with miscellaneous and jobber buying improving in spots. Only small tonnage is involved in protective covering following price reaffirmation for second quarter. Prices are somewhat firmer on galvanized sheets. B. F. Sturtevant Co. has the contract for blowers for naval vessels being built at Boston, Charleston, S. C., and Puget Sound, Wash., at $287,232.

New York — Business has lagged so far in March but sellers expect some improvement this month. Building requirements are counted on for larger tonnages, with heavier automotive demand also looked for. A lag in orders from household equipment makers is regarded as only temporary. January sales of domestic refrigerators to distributors and dealers were 43 per cent larger than a year ago, according to the National Electrical Manufacturers association.

Releases of some fair specifications direct by the automobile trade in the Detroit area, have not been followed by a spread of cold strip orders from accessory and parts-makers. Most consumers appear to be operating with low inventories, buying frequently in small lots for immediate delivery.

Buffalo — Definite betterment in flat-rolled steel demand still is lacking, a minor gain early in the month having been short-lived. Some automotive orders are appearing, but the tonnage is light.

Philadelphia — Ten passenger cars placed with a local builder will require 150 tons of stainless steel. The same interest also has booked a large order for trailer bodies requiring 125 tons of stainless. A large maker of auto bodies and frames also has placed 2500 tons of hot and cold-rolled sheets. Requirements of several smaller consumers give a better appearance to the market.

Sure! we're
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The Furnaces
Your large tonnage requirements can be handled promptly by National-Erie's 25-ton open hearth furnaces . . . and your smaller tonnage requirements, especially Neloy alloy steel and special castings can be filled efficiently from the 3½ and 1½-ton electric furnaces . . . facilities for handling any type casting requirement large or small.
The Foundries
Many times National-Erie's job foundry puts through a special job quickly without disturbing the regular production . . . and for the big tonnage jobs, National-Erie's pattern shop and foundry facilities and equipment are unequalled.
Control
Modern methods of sand control and hardness testing are used in National-Erie's metallurgical laboratories . . . Here, under one roof, you find all the facilities to give you uniformity of product, dependability of service, and economy in working out your requirements.
Heat Treating
Modern heat-treating furnaces with pyrometer control are used before liquid quenching . . . a special department for flame hardening with specially designed torch tips for various tooth sizes assures uniformity of hardness and penetration in Neloy treatment No. 10-A and B.
Machine Shops
National-Erie machine shops manned by experienced machinists are equipped with modern machine tools. The complete gear cutting department with high speed gear cutters and generators produces a wide variety of gear types and sizes.
Your inquiries for steel castings, special gearing, and Neloy alloy steel cut gears will receive prompt attention.
NATIONAL — ERIE CORPORATION ERIE, PENNA.

York Ice Machinery Corp., York, Pa., is starting production of a new low-price air-conditioning unit. A tentative schedule of 1500 units weekly is said to be a record rate for the industry.

Youngstown Sheet & Tube Co. was awarded approximately 315 tons of sheets by Lewisburg, Pa., penitentiary. On a typical lot of 50 tons of 18 gage material, 45¼ x 108 inches, 2.985c, delivered, was bid.

Cincinnati — Sheet prices are steadier but have not been tested thoroughly since the recent reaffirmation. Galvanized sheet quotations are firm, with demand tending upward seasonally. Automotive specifications are steady. Few consumers are buying far ahead.

St. Louis — Sheet inquiries and sales lately have been the best since early January. Enameling stock is moving better to stove and refrigerator interests, but shipments to the furniture trade are below expectations. Light galvanized sheets for manufacture of containers are more active than heavier gages.

Birmingham, Ala.—Sheets continue to be turned out virtually at capacity. Demand is fairly evenly distributed between manufacturers' and roofing sheets, with the latter holding a slight edge.

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1906-1939
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Manganese and Alloy Steel Castings One Half to One Thousand Pounds Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Plates

Plate Prices, Page 78

Chicago — Good demand is reported here. Miscellaneous business is broad, while tank and railroad car needs also give this market better activity than is appearing in structural material. Building construction and shipbuilding also contribute to demand.

Boston — New bids will be taken on the New Britain, Conn., filtration plant, originally involving 1000 tons, mostly plates. Previous tenders exceeded the appropriation. Awards include 150 tons for a Bellingham, Mass., standpipe. Miscellaneous buying is picking up slowly. Shipyard releases are steady but not widely distributed, except for open-bid requirements for navy yards. Such tonnage occasionally brings out moderate price shading.

New York — Ship plate demand is broadening further, and producers have accumulated a sizable backlog of this type of material. A pickup in turbine orders for utilities also aids the plate outlook. Oil company demand is rather light, but prospects are regarded better than in 1938. Pending business for railroad equipment includes plate requirements for 300 gondolas for the Maine Central, 500 hopper cars for the Lehigh Valley, 15 locomotives for the Union Pacific and 11 tenders for the Rock Island. About 10,000 tons of ship plates is being figured for Holland and Sweden.

Philadelphia — Harrisburg, Pa., will take bids April 4 on 170 tons of plates for a water supply project. The same city also will require about 10,000 tons additional for which bids are expected to be asked in mid-April. Ship tonnage continues to bolster schedules of some mills with the release of about 3000 tons for C-3 boats now under contract. Miscellaneous business is slightly better but still is disappointing. Export movement is brisker.

Birmingham, Ala.—Production of plates continues at approximately 75 per cent of capacity. While orders, except for current specifications on shipbuilding, are generally in comparatively small lots, aggregate demand continues good.

San Francisco—Activity in plates is small and most inquiries are under 100 tons. Bent Bros. Inc., Los Angeles, was awarded the general

contract for penstocks for the Conchas dam, N. Mex., 132 tons for 90-inch pipe. Bids are expected soon for about 700 tons for a welded steel pipe line for Fallbrook, Calif. So far this year 12,693 tons have been placed, compared with 11,701 tons for the corresponding period in 1938.

Seattle—Demand for plates is nominal, no large projects up for figures. Seasonal volume is moving for ship and boiler repair jobs. Puget Sound Sheet Metal Works, Seattle, will fabricate a large cement storage tank for Superior-Portland Cement Co., Seattle, tonnage unstated.

Plate Contracts Placed

700 tons, storage tank, city of Milwaukee, to Koppers Co., Pittsburgh.
415 tons, water tank, Grand Forks, N. Dak., to Pittsburgh-Des Moines Steel Co., Pittsburgh.
205 tons, elevated water tank, Tuscon, Ariz., to Allison Steel Mfg. Co., Phoenix, Ariz.
200 tons, rolled plates for tank work, Lukens Steel Co., Coatesville, Pa., through Graver Tank & Mfg. Co., for work at Sparrows Point, Md.
132 tons, 90-inch steel penstock, Conchas dam, New Mexico; general contract to Bent Bros. Inc., Los Angeles Railway building, Los Angeles, at $123,910.40.
125 tons, standpipe, Bellingham, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.
110 tons, 25,000-barrel tank, Corpus Christi, Tex., to Wyatt Metal & Boiler Works, Dallas, Tex.

Bars

Bar Prices, Page 78

Pittsburgh — Little change is seen as yet in new business in carbon steel bars since the announcement of the second-quarter price reaffirmation. Releases by the usual consumers are coming forward in routine fashion, indicating that March shipments will surpass February by about 10 per cent in some instances.

Cleveland—Hot-rolled bar specifications are moderately heavier, the improvement coming principally from other than automotive interests. New business is steady but continues limited to requirements only a short distance ahead. New quantity differentials on hot-rolled and cold-finished bars are being applied on current business when the revised schedules accrue to the advantage of the buyer.

Chicago — Demand continues active, particularly as compared with business in some other products. Both automotive interests and farm equipment builders provide strong support to present demand, while some improvement in needs of miscellaneous users is expected by the end of the month.

Boston—Improvement in bar buying has been slight. Orders are more numerous, but generally small with alloys making the best showing. Demand by machine tool builders is well maintained, but bolt and nut requirements lag. Shipyard needs are increasing. Forging shop demand is steady, but light.

New York—Business in plain carbon bars is spotty, with volume smaller than a month ago. Cold-finished orders are reported as fairly satisfactory, although government shop demand has declined. Machinery and machine tool requirements are being stepped up, demand from the aviation industry is increasing and there has been a slight improvement from auto accessory interests. However, latter buying still is disappointing. New quantity differentials are being adopted by cold-finished bar schedules, conforming to the schedule published elsewhere in this issue.

Philadelphia — Eastern cold-finished carbon bar sellers have re-

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I like the way those Kinnear Doors open up out of the way—and stay put! And push button control sure is handy.
WORKMAN
There's no time lost in opening and closing service doors around here, since we put in Kinnear Motor Operated Rolling Doors.
SUPERINTENDENT
We find we get more value per door dollar with "Kinnears" because they save space, work faster and smoother, and last longer.
PURCHASING AGENT
Door operating and maintenance costs became an insignificant item after we installed Kinnear Rolling Doors.
MANAGER

Let us send you the new catalog of valuable information on door problems and how they can be solved the Kinnear way. Write today!

No wonder Kinnear Rolling Doors get all around approval! They operate with *maximum* efficiency in the *minimum* amount of space—opening upward on a vertical plane, easily and smoothly, and coiling compactly above the opening. They provide the durability of all-steel, plus its protection against fire, weather, intrusion and damage. They save space, time and effort, and cut installation, operation and maintenance costs. Kinnear Rolling Doors are made to fit any opening, can be equipped for motor, mechanical, or manual operation, and can be installed economically in any building, old or new.

The KINNEAR Manufacturing Company
1780-1800 FIELDS AVENUE - COLUMBUS, OHIO
Factories: Columbus, Ohio, and San Francisco, California

affirmed the current market for second quarter but have revised quantity differentials. Smaller sizes of cold-drawn material are moving better, especially to the screw machine trade, but larger diameters still are slow. Hot-rolled bar demand is spotty, although total tonnage is slightly heavier.

Buffalo — Bar production is up slightly, despite failure of automotive demand to improve appreciably. Most business is coming from miscellaneous users in this area.

Birmingham, Ala.—Movement of bars has shown little inclination to change since the current rate of approximately 80 per cent has been registered. Most of local output is for concrete reinforcing, occasioned by roadbuilding requirements.

Cold-Finished Steel

Cold Finished Prices, Page 79

New quantity differentials on cold-finished carbon bars reduce the extra on smallest orders and lower the quantity required to earn the maximum deduction. Lots of 10,000 to 19,999 pounds continue to take the base price. The extra on orders under 300 pounds has been reduced from $3 per 100 pounds to $2.50, and the addition on lots of 1000 to 1499 pounds has been raised from 90 cents to $1. Other extra brackets are unchanged.

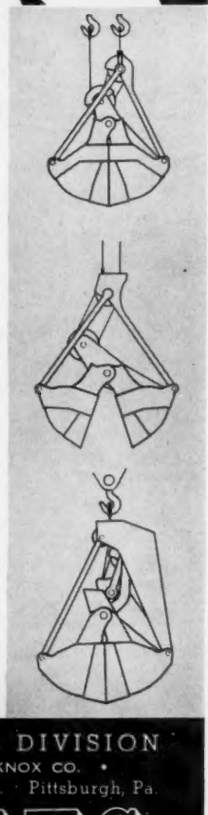
As on hot-rolled bars, the deduction of 15 cents per 100 pounds now applies on orders of 150,000 pounds and over, instead of 300,000 pounds. Other deductions include 10 cents on 100,000 to 149,999 pounds and 5 cents on 20,000 to 99,999 pounds. A few changes also have been made in certain quality and size extras.

Handling FERROMANGANESE from cars to stock pile this Blaw-Knox Bucket unloads an average of 7 cars per eight hour shift. The former cost of $.65 per ton was *reduced* to $.25 per ton.

This bucket handles LIMESTONE in pieces ranging from 6" to 12" from dock to 50-60 ton gondola, filling car in an average time of 20 minutes.

It unloads SPIEGEL from 50-60 ton car in 1½ hours without teeth, and handles PIG IRON from stock pile at the rate of about ¾ Cu. Yds. per grab.

Blaw-Knox Buckets are designed to meet Steel Mill requirements—put your bucket problems up to Blaw-Knox.



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• OF BLAW-KNOX CO. •
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Rails, Cars

Track Material Prices, Page 79

Considerable rail tonnage remains to be placed, according to plans by several roads. Atchison, Topeka & Santa Fe expects to place 56,000 tons, Erie 30,000 tons, Reading and Central of New Jersey 5000 tons each, Wabash 10,000 tons and Nickel Plate 4000 tons.

Missouri Pacific inquiry for 1150 cars and Illinois Central inquiry for 1000 cars are still pending. Five western roads are working on car programs which are likely to be placed early in second quarter, a total of about 8000, including 1000 for Chicago & North Western, 600 for Denver & Rio Grande Western and 100 steel underframes for St. Louis Southwestern.

Car Orders Placed

Canadian National, 50 refrigerator cars and 25 caboose cars, to own shops; in addition to 2000 box cars and 15 miscellaneous coaches recently noted as placed with various car builders.

Chicago, Rock Island & Pacific, six lightweight streamlined sleepers to Pullman Standard Car Mfg. Co., Chicago; ten lightweight stainless steel streamlined cars to Edward G. Budd Mfg. Co., Philadelphia.

Lehigh Valley, 500 fifty-ton hopper cars, to Bethlehem Steel Co., Bethlehem, Pa.

Lehigh Valley, 10 coaches, to Pullman-Standard Car Mfg. Co., Chicago.

Locomotives Placed

Chicago, Milwaukee, St. Paul & Pacific, six diesel-electric under lease-purchase agreements; two 600-horsepower to American Locomotive Co., New York, two 600-horsepower and two 1000-horsepower to Electro-Motive Corp., La Grange, Ill.

Chicago, Rock Island & Pacific, two diesel-electric locomotives, 2000-horsepower each, to Electro-Motive Corp., La Grange, Ill.

Car Orders Pending

Chicago & North Western, 1000 box cars; contemplated.

Denver & Rio Grande Western, 250 automobile, 250 box, 100 mill gondolas; bids in April.
St. Louis Southwestern, 100 steel underframes; bids asked.
Swift & Co., Chicago, two tank cars for export; bids asked.

Rail Orders Pending

Nickel Plate, 4000 tons; purchase authorized by directors; 2400 tons 112-pound, 1600 tons 100-pound.

Buses Booked

Twin Coach Co., Kent, O.: Eighteen 23-passenger for Toronto Transportation Commission, Toronto, Ont.; twelve 28-passenger and ten 32-passenger for New Orleans Public Service Co., New Orleans; six 41-passenger for Omaha & Council Bluffs Street Railway Co., Omaha; five 31-passenger for Motor Transit Co., Jacksonville, Fla.; three 23-passenger for Arkansas Power & Light Co., Little Rock, Ark.
American Car & Foundry Motors Co., New York: Eighteen 31-passenger for Philadelphia Rapid Transit Co., Philadelphia; five 30-passenger for Gary Railways Co., Gary, Ind.

Buses Pending

Detroit Street Railway department, 500 buses, 27-passenger capacity, 90 and 100-horsepower motors; city council approval asked.

Pipe

Pipe Prices, Page 79

Pittsburgh — Expected improvement in spring requirements of merchant wrought pipe is slow, although output and shipments continue fair. No new line pipe awards, for either gas or oil purposes, have appeared, but it is understood figures are asked for some minor oil pipe requirements for gathering and connecting lines in the Southwest.

New York — Cast pipe inquiries are gradually mounting with the approach of spring. Odd-lot purchasing is more active and tonnage up for estimates is heavier. Utilities are also buying more cast material and New York city is expected in the market shortly for 10,000 to 12,000 tons of cement lined.

Birmingham, Ala.—Pipe production is considerably advanced, the largest single award ever received by American Cast Iron Pipe Co., 16,000 tons of 30-inch for Greenville, S. C., having been placed last week. Inquiries are coming in renewed volume and lettings are expected this month from St. Petersburg, Miami Beach, Jacksonville and other points in Florida.

San Francisco—Demand for cast iron pipe is light. So far this year 6253 tons have been booked, compared with 6463 tons a year ago. No award has been made on 368 tons for Mesa, Ariz., on which United States Pipe & Foundry Co. is low, nor on 126 tons for Burbank, Calif.

Cast Pipe Pending

630 tons, 20-inch and under, Newport, R. I., bids in.
155 tons, 16 inch, for Canada Drive project, Seattle; Central Construction Co., Seattle, low.

Cast Pipe Placed

16,000 tons, 30-inch, water supply line, Greenville, S. C., to American Cast Iron Pipe Co., Birmingham, Ala.
425 tons, for St. Charles, Idaho, to Pacific States Cast Iron Pipe Co., Provo, Utah.
150 tons, 6 inch, for Portland, Oreg., to United States Pipe & Foundry Co., Burlington, N. J.

Wire

Wire Prices, Page 79

Cleveland — Business in manufacturers' wire is slow to expand, though heavier consumption is in prospect in ensuing weeks among automotive and some miscellaneous

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of VALUABLE INFORMATION
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HERRINGBONE · WORM · SPUR · GEAR SPEED REDUCERS · CUT AND MOLDED TOOTH GEARS · V-BELT SHEAVES
ANTI FRICTION PILLOW BLOCKS · PULLEYS · FRICTION CLUTCHES · TRANSMISSION APPLIANCES

interests. Demand for merchant wire products shows occasional gains and makes a favorable comparison with February volume. Prices are steadier.

New York — Hesitation among wire consumers is reflected in less incoming business with the lag extending to practically all finished wire products. There is little forward buying with prompt delivery specified at current orders.

Boston — Little improvement is noted in wire specifications, and finishing operations are down to 50 per cent in more departments. Consumption has declined, reflected in buying. There are a few exceptions, spring wire for the furniture trade and textile requirements holding. Manufacturers' wire, however, is less active.

Birmingham, Ala.—Wire products are in especially good demand with output sustained at approximately 70 per cent. Some restocking by jobbers and distributors is reported being done.

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PITTSBURGH, PENNA.

Shapes

Structural Shape Prices, Page 78

New York — Inquiry is heavier with indications that new tonnage up for estimates within the next six weeks will increase materially. More industrial requirements in moderate-sized lots are appearing. Walsh Construction Co. is low on contract 136, Delaware aqueduct, taking 3500 tons of structural tunnel supports, which makes better than 12,000 tons pending and bid, for three sections. Superstructure, Raritan river bridge, New Jersey, expected out in April, will take close to 10,000 tons.

Pittsburgh—Fabricators have received more inquiries from widely separated areas, none outstanding but each of fair tonnage. The largest is for 800 tons for a power plant for Owensboro, Ky., the others ranging downward to 115 tons for a West Virginia bridge.

Chicago—Demand for structural steel is fairly light with few new inquiries or awards. Jobs of less than 100 tons, however, are numerous. Chicago subway construction continues a feature. John Griffith & Son Co., Chicago, is low bidder on the general contract for the fifth section, about 3700 tons of liner plates and beam ribs and 250 tons of structural steel. The city has advertised for bids on the sixth section, April 6 closing date. City of Chicago also is advertising for bids March 27 on the Laramie avenue viaduct, 750 tons.

Boston—Small bridge inquiry is mounting, mostly I-beam spans, with Vermont closing March 24 on contracts for about 500 tons; Massachusetts, March 21 on 235 tons and Maine, March 22, a 105-ton grade crossing at Augusta. Meanwhile 1175 tons of plate, girders, Cottage Farm bridge overpass, have been tentatively awarded. Extensions to ways, piers and shop buildings at the Fore River shipyard, Bethlehem Steel Co., Quincy, Mass., take several thousand tons. District fabricating shops, excepting one at Holy-

Shape Awards Compared

	Tons
Week ended March 18	22,227
Week ended March 11	16,042
Week ended March 4	19,602
This week, 1938	20,632
Weekly average, year 1938	21,566
Weekly average, 1939	25,692
Weekly average, February	17,123
Total to date, 1938	163,132
Total to date, 1939	256,913

Includes awards of 100 tons or more.

oke, Mass., have small backlogs, most recent contracts having gone to Pennsylvania fabricators.

Cleveland—Private work has recorded some improvement, but awards remain well under 100 tons. A number of bridge projects scheduled to appear for bids within the next 30 days dominate the local market. National Engineering and Construction Co., Cleveland, are low on the Baltimore & Ohio railroad underpass, Lorain, O., involving 400 tons and Whitehead & Kales Co., Detroit, received a contract of 400 tons for a trade school, Toledo, O. Fabricated prices continue weak.

Philadelphia — Pending structural business displays some seasonal improvement, including surprising amount of private and semi-private work. Latter work includes 1500 tons for power house for which bids are expected shortly. More bridge work is noted in southeastern states. Substantial shapes and bars are pending for the Harrisburg-Pittsburgh super highway tunnels. Bids for Sideling hill job are due March 30 and the Laurel hill, March 31.

Buffalo—A moderately active market is featured by the award of 3000 tons for the steam generating plant at Oswego, N. Y., for the Central New York Power Corp., to Bethlehem Steel Co. Porter Building Co., Buffalo, was low on the general contract for a school at Hamburg, N. Y., calling for 200 tons.

San Francisco—Structural lettings were fair, 2081 tons, bringing the year's aggregate to 32,208 tons, compared with 18,262 tons for the same period last year. Pending business exceeds 5000 tons, most of which is expected to be placed within the next few days.

Seattle—Shapes lead in steel sales, although no large projects are in immediate prospect.

Shape Contracts Placed

3000 tons, steam generating plant, Central New York Power Corp., Oswego, N. Y., to Bethlehem Steel Co., Buffalo; Stone & Webster Engineering Corp., New York, low. Four more building units of similar size to be constructed.

2400 tons, bridge requirements for 1939, Rock Island railroad lines, to American Bridge Co., Pittsburgh.

1200 tons, oil refinery furnace buildings, Consolidate Refineries Ltd., Hafia, Palestine, evenly divided between Belmont Iron Works, Philadelphia, and American Bridge Co., Pittsburgh; through M. W. Kellogg Co., New York, also includes 150 fifty-thousand barrel tanks.

1100 tons, Margaret Hague hospital building, Jersey City, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

1000 tons, Cottage Farm bridge, Cambridge, Mass., for Metropolitan district commission, to American Bridge Co., Pittsburgh.

935 tons, building, Link Belt Co., Indianapolis, Ind., to Insley Mfg. Co., Indianapolis.

710 tons, wind tunnel, Langley Field, Virginia, to Pittsburgh - Des Moines Steel Co., Pittsburgh.

670 tons, bridge FAP-140B, Williamson county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.

630 tons, bridge FA-580-B1, Castlemans Ferry, Va., to Virginia Bridge Co., Roanoke, Va.

600 tons, building, for Mountain States Telephone & Telegraph Co., Salt Lake City, Utah, to Bethlehem Steel Co., Bethlehem, Pa.

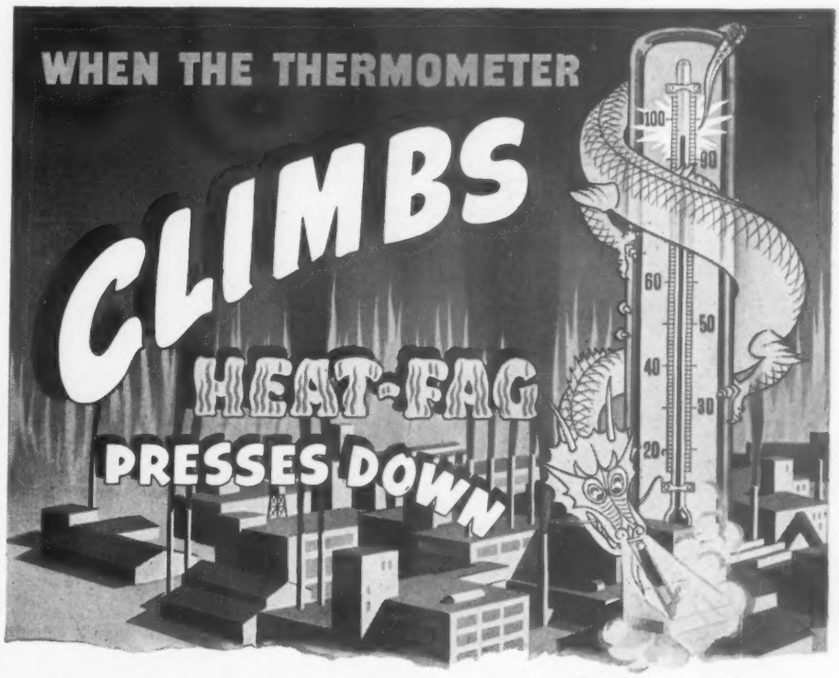
595 tons, building addition, R.C.A. Mfg. Co., Indianapolis, to Whitehead & Kales Co., Detroit.

585 tons, factory building, Divco Twin Truck Co., Detroit, to Whitehead & Kales Co., Detroit.

560 tons, central heating plant, New York, for Metropolitan Life Insurance Co., to Ingalls Iron Works, Birmingham, Ala.

550 tons, ward building No. 3, Gallinger hospital, Washington, to Fort Pitt Bridge Works, Pittsburgh; Bahen & Wright, Washington, general contractors.

510 tons, barracks and apartment building, Fort Jay, New York, to Levinson Steel Co., Pittsburgh, Thomas J. Wa-



HEAT-FAG is a reality — an unseen but actual force which costs industry thousands of dollars every time the thermometer climbs. Hot days and heavy work make men sweat — and unless the salt that's sweated out of their bodies is replaced, Heat-Fag takes its toll, production sags, and profits suffer.

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Dissolve in 50 Seconds

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This modern dispenser—and Morton's Salt Tablets—represent the most efficient and sanitary method yet perfected to supply salt to employes. A single push of the lever at the base dispenses one tablet at a time. Install Morton's Dispensers and Salt Tablets in your plant now. Place your order today. Shipments will be made promptly — prepaid.

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MORTON SALT COMPANY CHICAGO, ILLINOIS

ters & Sons, Inc., New York, general contractor.

470 tons, United States naval air station, Alameda, Calif., to Independent Iron Works, Oakland, Calif.

450 tons, girls' trade school, Toledo, O., to Whitehead & Kales Co., Detroit.

422 tons, highway bridge, Tayler, Tex., to Bethlehem Steel Co., Bethlehem, Pa.

335 tons, bridge FAP-648E, Gellin county, Texas, to Mosher Steel Co., Dallas, Tex.

300 tons, gallery extension, for San Diego Consolidated Gas & Electric Co., San Diego, Calif., to National Iron Works, San Diego.

290 tons, central grade and high school, Clayton, N. Y., to Smith & Caffrey, Syracuse, N. Y.

285 tons, bridge, contract 416, Westchester county, New York, to American Bridge Co., Pittsburgh.

280 tons, bridge, contract 1756, Morristown, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

275 tons, columns for building, for Mountain States Telephone & Telegraph Co., Salt Lake City, Utah, to Midwest Steel & Iron Co., Denver.

275 tons, service building, Lockheed Aircraft Corp., Burbank, Calif., to Bethlehem Steel Co., Los Angeles.

250 tons, A C barracks Honolulu, T. H., to unnamed interest.

250 tons, building, for F. W. Woolworth Co., Springfield, Mass., to American Bridge Co., Pittsburgh.

250 tons, women's dormitories, University of Wisconsin, Madison, Wis., to Crown Iron Works Co., Minneapolis.

250 tons, floor framing for press pits, press shop, for General Motors Corp., Grand Rapids, Mich., to American Bridge Co., Pittsburgh.

235 tons, bridge SAP-1052-E, Barton county, Georgia, to Virginia Bridge Co., Roanoke, Va.

235 tons, acid recovery building, Lewistown, Pa., to American Bridge Co., Pittsburgh.

220 tons, platforms, Sun Oil Co., Marcus Hook, Pa., to Frank M. Waver & Co., Inc., Lansdale, Pa.

185 tons, Hanover Acres housing project, Allentown, Pa., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

180 tons, school, West Lynn, Mass., to West End Iron Works, Boston.

165 tons, bridge FAGH-83-D, Clarke county, Mississippi, to Jones & Laughlin Steel Corp., Pittsburgh.

165 tons, bridge 1197-B1, Gwynns Island, Virginia, to Virginia Bridge Co., Roanoke, Va.

165 tons, addition, apartment building, State College, Pa., to Reading Steel Products Inc., Reading, Pa.

155 tons, building, Tubize-Chatillon Corp., Rome, Ga., to Ingalls Iron Works, Birmingham, Ala.

155 tons, addition, geology building, Golden, Colo., to Denver Steel & Iron Co., Denver.

150 tons, three I-beam bridges, Dover, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Rome Construction Co. Inc., Holden, Mass., general contractor.

140 tons, Fourteenth street viaduct widening, Denver, to Wisconsin Bridge & Iron Co., Milwaukee.

125 tons, bridge FAP-488, Giles county, Tennessee, to Virginia Bridge Co., Roanoke, Va.

110 tons, warehouse, Procter & Gamble Co., Chicago, to A. F. Anderson Iron Works, Chicago.

110 tons, building, Houston Gas & Fuel Corp., Houston, Tex., to Commercial Iron Works, Houston, Tex.

105 tons, bridge PWA-1269-F-83-B, Clarke county, Mississippi, to Jones & Laughlin Steel Corp., Pittsburgh.

100 tons, settling basin, metropolitan water district, Los Angeles, to unnamed interest.

100 tons, four oil derricks, Standard Oil Co., Vulcan Oil Co., Traders Oil Corp. and Montebello Reservoir Oil Co., Montebello, Calif., to unnamed interests.

Shape Contracts Pending

10,000 tons, superstructure, Raritan river bridge, Sayreville-Woodbridge, N. J.; bids in about six weeks.

3500 tons, contract 316, Delaware aqueduct, Ulster county, New York; Walsh Construction Co., New York, low; bids March 14, board of water supply, New York; also 105 tons, inner lining.

2000 tons, steel piling, substructure of bridge over Mississippi river at Greenville, Miss.; F. V. Ragsdale Construction Co., Memphis, Tenn., low on general contract.

1500 tons, three bridges, North Carolina highway department; bids in March 15.

1500 tons, powerhouse, Philadelphia Electric Co.; date for bids not set.

1200 tons, plate girder spans, grade crossing, Queens, contract SC-39-5; bids in to department of parks, New York.

800 tons, water and power plant building, Owensboro, Ky., for city.

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Reduces INGOT COSTS

What is LIQUITOL?

A scientifically prepared fine dry powder which insures sound STEEL INGOTS.

LIQUITOL produces an exothermic action which retards Cooling of hot-top metal. Secondary piping is caused by occluded gases, it follows that if the hot-top is kept open longer gases have a better chance to escape.

Why is LIQUITOL *used?*

Eliminates piping INGOTS.

Hot Top metal reduced up to 3".

INGOTS are structurally more perfect.

Cavities and porosities practically eliminated. Crop heads are greatly reduced. Better fluidity of molten metal during cooling.

Will not* CONTAMINATE *steel in any way.

Where intermittent feeding is practiced there is absolutely no possibility of LIQUITOL being carried into INGOT.

Does not solidify but forms a fusible coating which can be disturbed for observation. Additional metal can be poured through LIQUITOL without danger of LIQUITOL entering body of INGOT.

LIQUITOL saves its cost many times, due to sounder* INGOTS *you secure through its use.

Ask for Bulletins AL 22

THE ALPHA-LUX COMPANY, INC.

192 Front Street

NEW YORK CITY

***Branches:* Philadelphia - Chicago**

750 tons, Laramie avenue viaduct, Chicago; bids March 27.

600 tons, hospital, Holy Family of Nazareth, Philadelphia; bids March 24.

500 tons, contract 418, Fleetwood viaduct, New York.

440 tons, bridges, Windham, Conn.

415 tons, supports for equipment in substations; bids to Bonneville authority, Portland, March 24; specification 194.

400 tons, underpass, Baltimore & Ohio railroad, Lorain, O.; National Engineering & Construction Co., Cleveland, low.

400 tons, high voltage laboratory building, Washington, for U. S. treasury department.

300 tons, substructure of state bridge, Erie avenue, Lorain, O.

300 tons, alterations and additions to building, for United Aircraft Corp., East Hartford, Conn.

300 tons, laboratory, bureau of standards, Washington; bids in April.

300 tons, Missouri highway commission, Jefferson City; bids March 20.

288 tons, bridge, Cadolo parish, Ind.

275 tons, high school, Sinclairville, N. Y.

250 tons, metal storage building, for Aluminum Co. of America, Cleveland.

250 tons, structurals, also estimated 3700 tons beam ribs and liner plates, fifth subway section, Chicago; John Griffith & Son Co., Chicago, low bidder.

235 tons, high school, Norwalk, O.

230 tons, alterations to building, for General Baking Co., New York.

225 tons, stadium, Massillon, O.

205 tons, repairs to bridge over Mississippi river, Quincy, Ill., for Chicago, Burlington & Quincy railroad.

200 tons, school, Hamburg, N. Y.; Porter Building Co., Buffalo, low.

195 tons, school, Almond, N. Y.

175 tons, bulk plant, Cincinnati, for Standard Oil Co.

170 tons, bridge, Westport, Conn.

165 tons, bridge, Trumbull, Conn.

150 tons, state bridge, Exchange street, Athol, Mass.

150 tons, apartment, Wynne Wood, Pa.; bids March 22.

150 tons, Home for Incurables, Washington; bids March 22.

150 tons, 182-foot three span WF-beam bridge, Wardsboro-Jamaica, Vt.; bids March 24, H. E. Sargent, commissioner of highways, Montpelier.

140 tons, building, for Fischer's bakery, St. Bernard, O.

140 tons, bridge, Athol, Mass.

135 tons, 100-foot deck truss with two steel beam approaches, Townshend, Vt.; bids March 24, H. E. Sargent, commissioner of highways, Montpelier.

125 tons, New York approach to George Washington bridge, New York.

120 tons, 168-foot two-span I-beam bridge, North river, Halifax, Vt.; bids March 24, H. E. Sargent, commissioner of highways, Montpelier.

115 tons, signal bridges, Barboursville and Peach Creek, W. Va., for Chesapeake & Ohio railway.

100 tons, bottling plant, Coca Cola Co., Philadelphia; bids March 24.

100 tons, I-beam bridges, Huntington, Bolton and Hinesburg, Vt.; bids March 24, H. E. Sargent, commissioner of highways, Montpelier.

100 tons, Charles Edwin Fox memorial; new bids March 22.

100 tons, WF-beam bridges, Wardsboro and Andover, Vt.; bids March 24, H. E. Sargent, commissioner of highways, Montpelier.

100 tons, school, East Pembrook, N. Y.; Sauke Bros., Rochester, N. Y., low.

Unstated tonnage, 125-ton traveling crane for Ampere substation; bids to Bonneville authority, Portland, March 22; specification 190.

Unstated tonnage, sixth subway section, Chicago; bids on general contract April 6.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 79

Bolt, nut and rivet business shows only small variations. In the East demand has been somewhat lower this month, while in the Middle West a steady or slightly higher trend is noted. Distribution of the New York Central tonnage leaves but little pending railroad business. Specifications from shipbuilders are steady, with additional orders pending for ships placed recently. Automotive requirements are slightly heavier, and demand from farm equipment builders is sustained. Jobber buying is fair, but some interests are engaged in reducing rather liberal stocks acquired in late 1938.

● Thomas Engineers had been selected to specify the analysis, temper and finish of the steel to speed up this particular work and improve the product. The man on the job reports . . "This special steel solved our problem." You may find a better steel by the same process. . . When the right Thomastrip goes on the job you can expect definite improvements.

Thomastrip is made in many electro-coatings as well as bright finish—accurate to specifications—uniform coil after coil—and dependable for every purpose where cold strip steel is used.

Thomas Strip
COLD ROLLED STRIP STEEL

Bright Finish Uncoated Electro Nickel Coated
Electro Copper Coated Electro Zinc Coated
Electro Bronze Coated Electro Brass Coated

THE THOMAS STEEL COMPANY • Warren, Ohio
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Behind the Scenes with STEEL

Eskilstuna in Detroit

■Last week in the little town of Eskilstuna in the land of Sweden 75-year old Carl Edvard Johannson was presented with a bronze plaque by the Detroit Swedish Engineers society on the occasion of his birthday. And in the motor city of Detroit hundreds of precision-minded engineers filed into Convention Hall to inspect more than 200 exhibitions of the progress in which the inventor's "Jo" blocks have played such an important part.

STEEL on Hand

■ For the second year the show was a definite success. Aisles of the exhibition bore names of the society's top officers, and in the thick of things on George Smart avenue near the intersection with Frank Shuler square STEEL's booth was our haven for resting tired dogs. Across the aisle the National Tool Salvage Co. did a land office business of distributing a very tricky match holder and a yardstick cane. Next door the Physicists Research Co. of Ann Arbor measured noises, played records of grunts and groans and ran a couple of new silent vacuum sweepers.

Other Attractions

■ In an atmosphere of a county fair with goppy ice cream cones covered with chocolate and nuts we strolled up and down all week seeing the things that are behind the scenes of the smooth running cars our friends have. A very lovely lady engraved our signature on our fountain pen and we drank gallons of Vernor's ginger ale for much the same reason. 'Twas quite a week.

Mr. Shaner Speaks

■ Conventions were practically rampant in Detroit with the local chapter of American Society for Metals meeting Monday night, the Tool Engineers Tuesday night, the Detroit Industrial Marketers Wednesday night, the American Foundrymen's association Thursday night and the Tool Engineers again Friday night. By Saturday night the hospitals were filled and bicarbonate of soda was going at $12 an ounce. Incidentally, Editor-in-Chief E. L. Shaner addressed the industrial marketers and a capacity crowd was on hand to hear him analyze various phases of marketing procedure as affected by current political and economic conditions.

Ghost Salesman

■ Newest wrinkle used in peddling DeSotos is the trick car which has been rigged up with a concealed phonograph with a complete seven minute sales talk synchronized with electrical devices that switch headlamps on and off, open and close luggage door and hood, stop and start the engine and generally do all that the up-and-at-'em salesman would with a prospect on the hook. Although uncomfirmed, it was rumored in Detroit last week that the competition will make this scheme passe with another new model which will serve sandwiches and small beers, at the same time automatically unfolding road maps for easy inspection.

First Signs

■ Spring's silken wings have fluttered over Toledo, O., according to news dispatches which reveal the lighthouse tender Crocus has taken Harley Johnson, keeper of the harbor light, together with his two assistants, out 10 miles beyond the mouth of the Maumee river, to oil up his light and remain on the job until September. Last week channel spars and buoys were set, while the inner bay ranges flashed their vernal lights last Tuesday. Last week a robin perched outside our office window, apparently musing of time and the river, or something.

—SHRDLU

—The Market Week—

Reinforcing

Reinforcing Bar Prices, Page 79

New York — Inquiries are featured by five Circumferential highway contracts, Brooklyn-Queens, requiring better than 1000 tons. New work is coming out at a better rate than current awards which include 780 tons, Fleetwood viaduct, Mt. Vernon, N. Y., to Jones & Laughlin Steel Corp., Long Island City warehouse. Reinforcing bar prices have strengthened slightly, but contractor-buyers shopping for concessions, are still able to pick up tonnage under listed quotations.

Pittsburgh—New business in concrete reinforcing bar has been small. New projects include an auditorium for Oberlin college, 200 tons; and an auditorium at East Lansing, Mich., 225 tons; a grain elevator at Cincinnati, 250 tons.

Cleveland — Little improvement has been recorded in reinforcing inquiries or awards. Fabricators are operating at relatively low levels with backlogs substantially reduced. However, with the appearance of warmer weather some fairly large construction projects should develop. Prices remain weak.

Chicago — Local business is continuing a recent uptrend in volume, although individual inquiries and awards announced recently are all less-than-100-tons each. Total pending tonnage has risen slowly, while the trade expects further gains as a result of expanded construction activities this spring. Private construction particularly appears on the upgrade. Backlogs of producing interests are sizable.

Boston—Connecticut has bids on eight highway projects, taking close to 500 tons of reinforcing steel, and miscellaneous building requirements are slightly heavier. While several hundrd tons are needed for sewers in the Boston district, most of several thousand tons will be tunnel ribs and other heavier material.

Philadelphia—Other than a few

Concrete Bars Compared

	Tons
Week ended March 18	8,558
Week ended March 11	5,273
Week ended March 4	16,578
This week, 1938	7,949
Weekly average, year, 1938	6,959
Weekly average, 1939	12,195
Weekly average, February	8,268
Total to date, 1938	61,493
Total to date, 1939	121,952

Includes awards of 100 tons or more.

public jobs no outstanding bar tonnages are before the trade. However, smaller fabricators report considerable volume of small jobs beginning to appear, mostly alterations and additions.

St. Louis—Market for reinforcing steel bars shows more life. In addition to numerous small jobs, the initial letting of Missouri highway projects, 700 tons, is scheduled for March 20. Included is a bridge at Joplin, 400 tons.

San Francisco—A fair volume of reinforcing bars awards has been placed, 2462 tons, bringing the total to 49,322 tons, compared with 22,300 tons for the corresponding period in 1938.

Seattle—Inquiry is slow. Mills have fair tonnages on books but operate only part time. Prices are firm. Awards are expected shortly for 2500 tons for the Coulee project, bids to reclamation bureau, Feb. 16 and 435 tons for the Eugene, Oreg., water reservoir, general contract let.

Reinforcing Steel Awards

2450 tons, third subway section, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; through Michael Pontarelli, general contractor, Chicago.

1000 tons, resort buildings, Arrowhead Springs, Calif., to unnamed interest.

780 tons, contract 415, Fleetwood viaduct, Mt. Vernon, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh; Foley Bros., New York, general contractors.

700 tons, bridge over Susquehanna river, Havre de Grace, Md., to Bethlehem Steel Co., Bethlehem, Pa.; Robert C. Reitz, Lancaster, Pa., contractor.

600 tons, industrial building, Pratt & Whitney division, Niles-Bement & Pond Co., Hartford, Conn., to Truscon Steel Co.; through James Stewart & Co., New York.

435 tons, reservoir, Eugene, Oreg., to unnamed interest; general contractor, H. J. Adler Construction Co., Box 195, Yakima, Wash.

390 tons, girls' dormitory, Ann Arbor, Mich., to Great Lakes Steel Corp., Detroit, through McRae Steel Co., Detroit.

350 tons, apartment building, Detroit, to Great Lakes Steel Corp., Detroit, through Concrete Steel Fireproofing Co.

300 tons, grain elevator, Earl & Daniels Co., Cincinnati, to Pollak Steel Co., Cincinnati; through Jones & Hettelsater, general contractors, Kansas City, Mo.

300 tons, state highway projects, Connecticut, to Truscon Steel Co., Youngstown, O.; through Mariani Construction Co., New Haven.

200 tons, new steam-generating plant, Central New York Power Corp., Oswego, N. Y., to Truscon Steel Co., Buffalo.

200 tons, swimming pool, high school, Beverly Hills, Calif., to unnamed interest.

150 tons, ward building No. 3, Gallinger hospital, Washington, to Sweets Steel Co., Williamsport, Pa.; Bahen & Wright, Washington, general contractor.

150 tons, science building, junior college, Phoenix, Ariz., to unnamed interest.

140 tons, girls' vocational school Toledo, O., to Hansman Steel Co., Toledo; through Henry J. Spieher, general contractor, Toledo.

113 tons, tunnel lining, Lane county, Oreg., to unnamed interest.

100 tons, post office, Fullerton, Calif., to unnamed interest.

100 tons, addition to Sears, Roebuck & Co., 1100 Westwood boulevard, Los Angeles, to unnamed interest.

100 tons, undercrossing, Southern Pacific tracks, Riverside county, California, to unnamed interest.

Reinforcing Steel Pending

3650 tons, fifth subway section, Chicago; John Griffith & Son Co., Chicago, low.

700 tons, highway and bridge work for Missouri highway commission, Jefferson City; bids March 20.

600 tons, library, Toledo, O., Frank Messer & Son Inc., Cincinnati, general contractor.

400 tons, sewer, New Haven, Conn., New Haven Roads Construction Co., general contractor.

385 tons, substructure of bridge over Mississippi river at Greenville, Miss. F. V. Ragsdale Construction Co., Memphis, Tenn., low on general contract.

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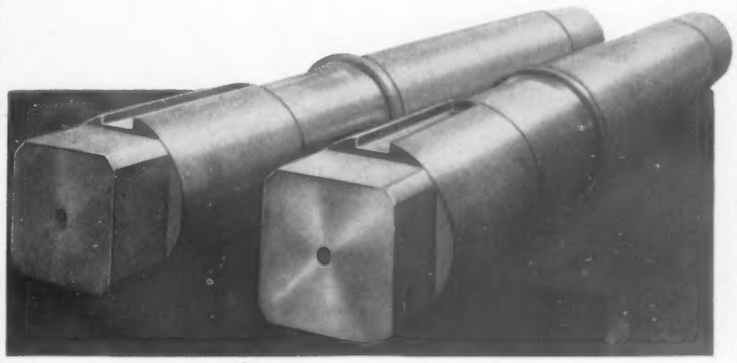

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"Standard" controls every operation from raw materials to finished product. Into each piece goes a quality bred by years of experience and kept up to date by constant engineering research. This is one reason why "Standard" products give long life and economy in operation.

CASTINGS • FORGINGS • WELDLESS RINGS
WROUGHT STEEL WHEELS

BRAND

STANDARD Steel Works COMPANY

General Sales Office: PHILADELPHIA, PA.
District Offices
New York Chicago St. Louis San Francisco Portland, Ore.

350 tons, 6-story office building, Bakersfield, Calif.; bids soon.

325 tons, contract 316, Delaware aqueduct, Ulster county, New York; Walsh Construction Co., New York, low, bids March 14, board of water supply, New York.

315 tons, circumferential highway, contract MC-39-7, Cross Island boulevard; bids March 21, department of parks, New York.

250 tons, grain elevator, Cincinnati, O.

250 tons, contract MC-39-9, circumferential highway, Queens- Brooklyn, N. Y.; bids March 27, department of parks, New York.

250 tons, bureau of reclamation, Denver; bids March 22.

240 tons, contract SC-39-8, circumferential highway, New York; bids March 29, department of parks, New York.

225 tons, auditorium, East Lansing, Mich.

200 tons, auditorium, Oberlin college, Oberlin, O.

200 tons, housing project, Brookline, Mass.

160 tons, contract 39-6, circumferential highway, New York; Good Roads Construction Co., Nassau, Wantagh, N. Y., low.

150 tons, hospital administration building, Vauclain Home, San Diego, Calif.; bids March 20.

150 tons, addition, High and Latin school, Cambridge, Mass.; Rugo Construction Co., Boston, general contractor.

145 tons, grade crossing, circumferential highway at Long Island railroad, Queens, contract Sc-39-5; bids March 22, department of parks, New York.

130 tons, Waring school, St. Louis; I. E. Millstone Construction Co., St. Louis, low on general contract.

100 tons, overcrossing at Spokane, Wash.; Barnard-Curtis Co., Minneapolis, low.

Unstated tonnage, sixth subway section, Chicago; bids April 6.

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Kidd's Micrometer Agrees with Yours

Specializing for 41 years in the production of *drill rods* and cold drawn steels enables us to provide you with the best of material—accurately drawn and heat treated—carefully inspected and smoothly finished.

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—Also regular and special shapes for all purposes.

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CARBON-ALLOY AND SPECIAL BASIC ELECTRIC STEELS

COMPLETE control of all processing from selection of the melting charge to the finished condition is the N. F. & O. *guarantee of quality* in forgings furnished to your specifications — Smooth Forged, Hollow Bored, Rough or Finish Machined.

Die Blocks and Piston Rods

NATIONAL FORGE AND ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA., U. S. A.

Pig Iron

Pig Iron Prices, Page 80

Pittsburgh—Pig iron buying is gaining over February and January levels. Purchases are small individually, but foundries are increasing their melt gradually. Shipments against old orders also are expanding, although recent gains still leave much to be desired.

Cleveland—Shipments have varied only slightly so far this month compared with the February daily average, despite occasional gains in releases. Opening of second quarter books at unchanged prices has been followed by a fair number of bookings, considering that little business was expected so long as tonnages still were due against old commitments. Prices are steady.

Chicago — Shipments are about 10 per cent ahead of the corresponding period in February, slightly exceeding early estimates. Sales are said to have come up sharply, in connection with second quarter bookings. Reflecting the betterment in foundry melt, by-product foundry coke shipments are in line with an estimated increase of 10 per cent over February.

Boston—Pig iron shipments are up slightly, recovering from traffic delays caused by the recent heaviest snow of the winter. Buying, however, is light and in small lots. The recent 75-cent adjustment downward resulted in a mere flurry in demand, most consumers following the policy of purchasing close to requirements which in some instances tend to mount with scattered improvement in foundry melt. From Holland 2700 tons of iron has arrived at Bridgeport, Conn., and Boston, 1900 tons being landed at the former point, partly for sale from storage.

Philadelphia — The foundry melt has increased slightly to 55-60 per cent. Several jobbing shops now are averaging four to five days weekly. While shipments are fairly heavy, new business continues to lag. Most buying is for rush shipment, indicating low inventories.

New York — Pig iron business shows little change in new orders

or specifications. Machinery castings and building hardware involve best consumption, although soil pipe manufacturers are expected to be more active soon. A lag continues in demand from makers of railroad castings. Export inquiries are fairly numerous but generally are small.

Buffalo—Pig iron orders continue in small lots, but releases are sufficient to maintain production at 57 per cent. Foundry stocks are low, although the extension of prices and availability of early delivery removes the incentive for forward buying. Foundries are working three to four days a week.

Jackson, O.—Present prices on all grades of silvery iron will be continued into second quarter, it has been announced by Globe Iron Co.

Cincinnati — Southern iron specifications are slightly heavier, while northern iron shipments are at about the February average. Some expansion in the melt for heating equipment is believed imminent. Contracting is dull, but considerable tonnage has been rewritten.

St. Louis — More interest is shown in pig iron. Shipments are back to the January rate, while new orders are heavier, though still small, and inquiries for future needs are appearing. Stove foundries are busier, and farm implement makers are on higher schedules. Output of jobbing plants is steady.

Birmingham, Ala.—Pig iron production remains on the basis of 15 active stacks, quite a sustaining influence coming from pipe plants, which are receiving important orders.

Toronto, Ont.—Merchant pig iron sales show little change. Producers have opened books for second quarter contracts but booking is slow. It is understood, however, that several melters will inquire before the end of the month.

Scrap

Scrap Prices, Page 82

Pittsburgh—Consumers are not interested in buying scrap at present prices, and trading is confined largely to broker-dealer transactions. Quotations continue firm, with No. 1 heavy melting steel and compressed sheets $15.75 to $16, an increase of 25 cents at the bottom of the range. Good scrap is coming out slowly at these figures. Shipments against old orders are maintained, with recent gains in steelmaking supporting deliveries.

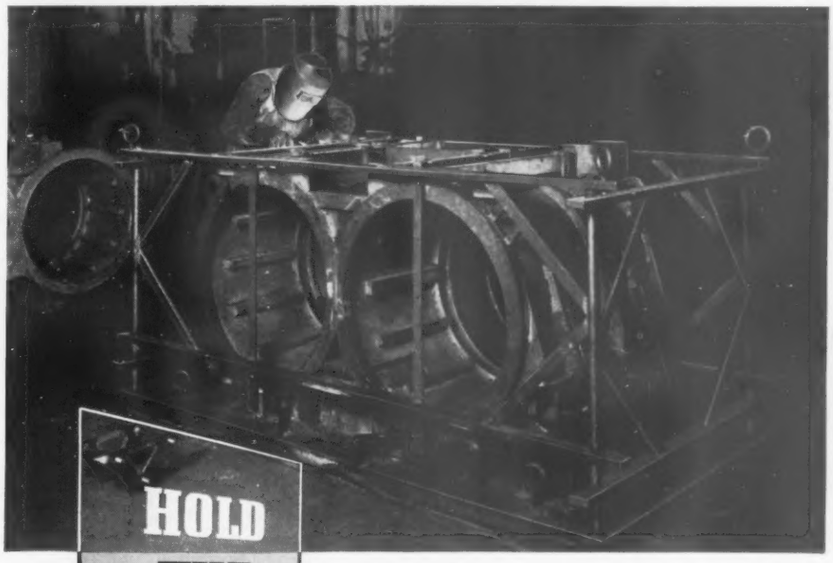
Cleveland — Prices generally are unchanged but continue strong in the absence of large supplies of available scrap at current levels. Higher quotations are regarded not unlikely on subsequent mill buying.

Chicago — Heavy melting steel is unchanged, with demand quiet, but a number of other grades are quoted higher. The latter include angle bars, short rails, sheet clippings and coil springs. No. 1 steel continues firm at $14 to $14.50, with $14.25 the most general price received by dealers.

Boston—For tonnage some brokers are offering better than $14 and $13, dock, for the two grades of heavy melting steel, but little material is coming out and most tonnage is moving at unchanged quotations. Domestic prices are generally unchanged but are slightly firmer, despite lack of sizable business from New England and Eastern Pennsylvania consumers.

New York — Indications are European scrap cartel delegation will resist paying higher prices, which may affect total tonnage closed. Some brokers believe no purchase will be made. Meanwhile export prices are steady and unchanged except for stove plate, which is off slightly to $9.50, barge. More than 90 per cent of activity in the immediate district is in export buying against old orders. Domestic buying is in line with present operations, without forward covering. Prices are steady but heavy breakable cast is down 50 cents.

Philadelphia — Scrap still has a bullish tone, with many smaller dealers holding out for higher prices in view of the anticipated large



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purchase by the European cartel. Some dealers are asking as high as $16.50 for No. 1 steel. In the meantime the cartel committee has placed no tonnage, and some feel orders will be held up unless prices are extremely favorable. Brokers covering old export business are reported offering up to $15.50 for No. 1 and up to $13.75 for No. 2. The domestic market is quiet, with most prices unchanged. Heavy cast is weak, a distress sale at $14.50 being reported. Specialty grades are steady.

Buffalo—Scrap continues dull, with buyers and sellers disagreeing on prices. Mills have sufficient supplies and are out of the market. Quotations are unchanged, but are becoming out of line compared with former margins between prices here and in other districts.

Cincinnati—Scrap is strong despite quietness in mill buying. Shipments against old contracts are steady. Bids on recent railroad lists were higher than a month ago. Heavy melting steel is none too plentiful, being held in anticipation of better consumption and prices.

St. Louis—Activity in scrap noted in other districts has yet to reach this center. Trading is slow and prices largely are nominal, though fairly steady in the absence of distress tonnages. Steady reduction of mill inventories points to renewed buying before long.

Birmingham, Ala. — Although there has been some added buying in scrap, No. 1 melting and cast, due to recent orders for steel and cast pipe, there has been no material change in the market. Prices are nominal.

Seattle — Movement of export shipments is being delayed by picketing by Chinese. Longshoremen refuse to pass these lines despite charges of contract violations and protests by Japanese government officials. Dealers are catering more to the domestic market in view of difficulties of exporting. Local rolling mills are buying in fair volume but foundry demand is not much improved. Prices are unchanged.

Toronto, Ont.—Trading continues slow, special grades attracting principal attention. Mills in the Hamilton district are taking heavy melting steel as offered, but are not pushing for deliveries. Dealers now are paying $9.50 to $9.75 for No. 1 steel, moderately below previous offerings. Machinery cast has a ready market, while stove plate is in demand and scarce.

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LUMBER CO.
ERIE, PA.
DUROCK
TRADE MARK

Warehouse

Warehouse Prices, Page 81

Cleveland—Business is steady or slightly heavier, with a small gain in prospect for March as a whole. April is counted on for further improvement. A reduction in the cold-finished bar price is expected shortly.

Chicago—Sales continue the upturn which started early this month but have yet to reach the high point of the January post-inventory period. Only major price change is a reduction of $5 a ton on cold-finished bars, accompanied by a new extra of $3 per 100 pounds on lots of less than 100 pounds. Extras on larger quantities are unchanged.

New York — Warehouse volume has improved slightly, with more small orders, well diversified, but March upturn has been slow. Revised quantity deductions on cold-finished bars brought reductions by jobbers as follows: 1000 pounds and over, 4.14c; 999 to 500 pounds, 4.64c; 499 to 300 pounds, 5.39c and 299 pounds and under 5.64c, on one size and grade.

Philadelphia — Cold-finished bars have been reduced $5 a ton to 4.11c. Sales generally are slightly heavier, with March to date topping both February and a year ago. Jobber stocks are shrinking and in many instances are below normal.

Buffalo — A slight seasonal pickup is noted in sales, although some distributors are disappointetd over absence of more pronounced improvement. Cold-finished bars have been reduced $5 a ton, with extras extended to a maximum addition of $3 per 100 pounds on orders of less than 100 pounds.

Cincinnati — Sales are moving ahead of the February rate, chiefly on industrial demand. A price revision in cold-finished bars is pending. Sheets are steady.

St. Louis — Sales have picked up noticeably, following a disappointing February. Inquiries also are more active. Oil country goods are moving well, and supplies for lumber mills, glass factories, quarries and cement plants are in better demand.

Tin Plate

Tin Plate Prices, Page 78

Tin plate business shows less buoyancy than usually is expected at this season, the recent reaffirmation of prices having had little effect on demand. Activity in general line cans is fair and some liberal specifications have been received for beer containers, but makers of packers cans are specifying conservatively. Meanwhile, tin plate production continues moderately below 55 per cent. In the Chicago district, where better releases against old orders are reported, operations are estimated at 60 per cent.

Some dissatisfaction is heard, particularly among smaller consumers, over extension of prices only through second quarter, instead of to the end of the canning season. Difficulty in figuring tin plate costs accurately is given as the reason for the objection.

Steel in Europe

Foreign Steel Prices, Page 81

London—(*By Cable*)—Trade in foundry grades of pig iron in Great Britain is dull, consumers apparently hoping for a further reduction in price. Basic and hematite operations are active. The steel trade is improving, additional melting and rolling plant being put in operation. Demand for scrap is increasing. Sheet mills and constructional steelworks are busy but shipbuilding remains inactive. Export trade to South Africa is brisk.

Steel and iron imports in February were 89,194 tons, a gain of 22,060 tons over 67,134 tons in January. Exports at 137,520 tons showed an increase of 17,500 tons over 120,020 tons in January.

The continent reports export trade quiet and prices easier, owing to competition from America, Australia and Central Europe.

Nonferrous Metals

Nonferrous Metal Prices, Page 98

New York—Resumption last week of Hitler's march to the East destroyed what hopes had been built up since Munich for an early resumption of a more normal flow of international trade and again aroused fears of a European war involving the leading nations. This resulted in a downward tendency in nonferrous metal prices abroad, due directly to speculative selling and hesitancy in making further commitments during this unsettled period.

Copper—Although export copper eased to around 10.20c, c.i.f., from 10.35c at the end of the previous week, and resale copper eased about 20 points to around 10.70c to 10.75c, producers held electrolytic firm at 11.25c, Connecticut. Sales here declined to a level slightly under the 1000-ton daily average rate. Easiness in the foreign market had its most important effect on red metal scrap with smelters lowering their bids ¼-cent to the basis of 9.12½c for No. 1 heavy.

Zinc—Shipments and sales are maintaining a satisfactory rate, reflecting the steady rise in galvanized sheet output to 62 per cent of capacity. Prices held steady on the basis of 4.50c, East St. Louis, for prime western.

Lead—Consumer demand tapered due to the well covered position of consumers and to the easier price tone in London which may necessitate, if continued, a revision in the domestic level. Prices held at 4.70c, East St. Louis.

Tin—Modification of the tin price fixing system in the East is being agitated since those who sold heavily on Tuesday were forced to pay an unexpectedly high price when they covered in the East on Wednesday. Straits spot fluctuated between 45.87½c and 46.25c.

Swedish Steelmaking at Purchasing Agents Show

■ Seven thousand attended the eleventh annual exhibit of Purchasing Agents Association of Cleveland Inc., in Cleveland, March 15-17. Display numbered more than 100.

A feature of special interest in the metalworking field was a sound-motion picture sponsored by Peninsular Steel Co., Cleveland, showing production methods employed by Uddeholms A. B., Sweden's leading producer of high-grade steel.

Starting with charcoal pig iron steel is produced in acid open hearths, bessemer converters, electric furnaces or old-time Lancashire furnaces. The company manages every step from ore to finished product on its own properties.

Ferroalloys

Ferroalloy Prices, Page 80

New York — With ingot production tending upward, ferromanganese sellers are confident of a further gain in shipments this month. Prices are steady, the current market of $80, Atlantic and Gulf ports, recently having been extended into second quarter. Domestic spiegeleisen deliveries also are expected to reflect better activity in steelmaking. Quotations on spiegeleisen and other leading ferroalloys are unchanged.

Equipment

Cleveland — R. W. Kaltenbach Corp., Bedford, O., has been awarded contracts for dry dock cranes by the bureau of yards and docks, navy department, as follows: One each for Boston, $100,000; Philadelphia, $100,000; Mare Island, Calif., $124,750. Star Iron & Steel Co., Tacoma, Wash., booked a unit for the Puget Sound yard, Bremerton, Wash., at

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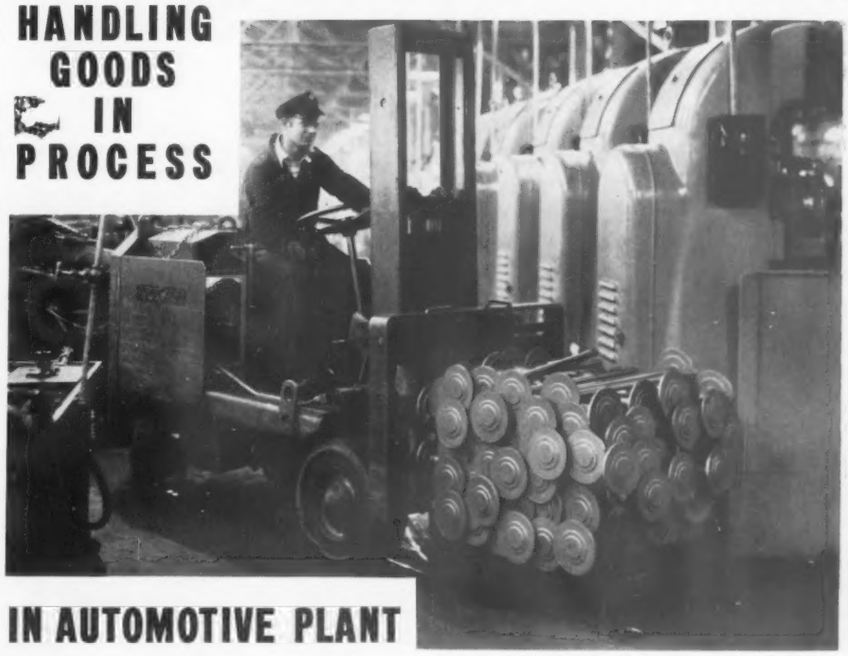

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$154,700. Bids on these cranes closed Feb. 17.

Chicago—Machine tool sales are well maintained after a recent measure of improvement. Inquiries are spotty, but active. Purchases in the Chicago district have become stronger, offsetting a slight loss in country buying.

Boston—Heavier inquiry for machine tool estimates is accompanied by a moderate gain in actual domestic orders, with indications that business during the next few months will mount satisfactorily. Some attractive orders continue to be taken for England and Japan, although Russian orders have slumped. Most New England builders have substantial backlogs and continue operating at relatively high rate, with some scattered increases in machine assembly lines. A Worcester builder of tools for the plastic industry has a notable backlog. Some grinding equipment producers promise about eight weeks delivery on special tools and are routing these ahead of export requirements.

The airplane industry, notably engine builders, has large programs pending, plus a substantial volume of current buying. More orders are also coming from the automotive and miscellaneous metal working industries, with indications that the year will develop encouraging gains.

New York — Machine tool dealers and builders are booking more domestic business from diversified industrial sources. While machinery orders are largely for replacement, except those from the airplane industry, evidence increases that in numerous instances releases are being given on considerable equipment which has been held up for months awaiting developments. Orders are being entered against inquiries pending for some time, with new inquiry coming out in increasing volume. Government shops are also placing substantial orders with indications buying by most departments will be progressively higher during the next few months.

Bids on 38 electric overhead traveling bridge cranes, 5 to 75-ton capacity, one of the largest inquiries since the war, by the bureau of yards and docks, have been postponed from March 15 to 29. These units, the first to include a total of 78 for navy yards, are for installation at Boston, Brooklyn, Philadelphia, Charleston, Norfolk, Puget Sound and Mare Island under schedule 9111.

Seattle — Bonneville authority, headquarters at Portland, Oreg., is the heaviest buyer in this market at present, constructing substations and much transmission line in Washington and Oregon. The following bids have been called: March 23, 69-kv. outdoor disconnecting switches for Kelso and Hood River, Spec. 189; March 25, construction of 13 transmission line crossing towers and stringing wire, over Willamette and Columbia rivers; March 14, furnishing plow steel wire, Spec. 195; March 27, furnishing guying materials for Bonneville-Dallas and Kelso-Raymond lines, Spec. 199; March 13, distribution transformers and cutouts; March 28, furnishing oil purifying equipment, Spec. 201; March 25, construction of foundations and erecting steel towers, Spec. 200.

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GARAGE IN CONNECTION

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Mar.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
11	11.25	11.37½	10.65	46.35	46.35	4.85	4.70	4.50	20.00	11.25	35.00
13	11.25	11.37½	10.55	45.90	45.90	4.85	4.70	4.50	20.00	11.25	35.00
14	11.25	11.37½	10.42½	45.95	45.95	4.85	4.70	4.50	20.00	11.25	35.00
15	11.25	11.37½	10.32½	46.25	46.25	4.85	4.70	4.50	20.00	11.25	35.00
16	11.25	11.37½	10.42½	46.15	46.15	4.85	4.70	4.50	20.00	11.25	35.00
17	11.25	11.37½	10.32½	45.87½	45.90	4.85	4.70	4.50	20.00	11.25	35.00

MILL PRODUCTS
F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets
Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes
High yellow brass 20.06
Seamless copper 19.87½

Rods
High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes
Copper, untrimmed 16.62½

Wire
Yellow brass (high) 17.56

OLD METALS
Nom. Del. Buying Prices

No. 1 Composition Red Brass
New York 6.37½-6.62½
Cleveland 7.00-7.25
Chicago 6.62½-6.87½
St. Louis 6.25-6.50

Heavy Copper and Wire
New York, No. 1 ..... 8.37½-8.50
Cleveland, No. 1 ..... 8.25-8.50
Chicago, No. 1 ..... 8.25-8.50
St. Louis 8.25-8.50

Composition Brass Borings
New York 5.62½-5.87½

Light Copper
New York 6.87½-7.12½
Cleveland 6.50-6.75
Chicago 6.62½-6.87½
St. Louis 6.50-6.75

Light Brass
Cleveland 3.75-4.00
Chicago 4.00-4.25
St. Louis 3.75-4.00

Lead
New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.60-3.85
St. Louis 3.25-3.50

Zinc
New York 2.50-2.62½
Cleveland 2.25-2.50
St. Louis 2.00-2.25

Aluminum
Borings, Cleveland 6.50-6.75
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 15.25-15.50
Mixed cast, St. Louis 7.75-8.25

SECONDARY METALS
Brass ingot, 85-5-5-5, less carloads 11.00
Standard No. 12 aluminum 12.50-13.00

Construction and Enterprise

New York

BATAVIA, N. Y. — Niagara, Lockport & Ontario Power Co. proposes to purchase new distribution feeders, distribution transformers; and construct line extensions, at total cost of $31,000.

GLENDALE, N. Y. — Mohican Steel Co. has awarded a $65,000 contract to Brown & Matthews Inc., 122 East Forty-second street, New York, for constructing a one-story manufacturing plant. F. J. Wasselle, Brooklyn, N. Y., architect.

NEW YORK — Orris Mfg. Corp. has been organized with capital of $20,000 to manufacture machinery. W. E. Menke, 70 Pine street, New York, representative.

NEW YORK — Wyatt Iron Works Inc. has been formed with 200 shares no par value capital stock. Representative, Howard Henig, 341 Madison avenue, New York.

NIAGARA FALLS, N. Y. — Hooker Electro-Chemical Co. has awarded contract to C. Bremer Co., Seneca avenue, Niagara Falls, for construction of a plant addition costing approximately $100,000. (Noted Jan. 2.)

ROCHESTER, N. Y. — Eastman Kodak Co. has plans for construction of a large addition to its plant here at approximate cost of nearly $50,000.

SENECA FALLS, N. Y. — Guaranteed Parts Inc., A. C. Hecht, president, Union Springs, N. Y., has awarded contracts in the remodeling of a building for manufacturing purposes at total estimated cost of about $40,000.

Connecticut

SHELTON, CONN. — City has completed a survey for construction of a sewage treatment plant and sewers at cost of more than $25,000. T. F. Bowe, New York, engineer.

Massachusetts

BOSTON — New York, New Haven & Hartford railroad, W. T. Dorrance, superintendent of construction, New Haven, Conn., will soon award contract for construction of a two-story, 20 x 114-foot repair shop costing more than $40,000 with equipment. E. E. Oviatt, New Haven, chief engineer for road.

FITCHBURG, MASS. — Harry Doehla Co., 46 Franklin street, plans to let contract soon for construction of a two-story, 60 x 72-foot factory addition estimated to cost about $40,000. J. S. Bilzerian, Worcester, Mass., architect.

PROVINCETOWN, MASS.—Town water department has plans to construct an iron removal plant costing $30,000. Whitman & Howard, Boston, engineers.

Ohio

ASHLAND, O.—City, W. A. Mason, mayor, has retained consulting engineer and is proceeding with its plans to construct a water softening plant costing $25,000, and to increase capacity of its reservoir.

CINCINNATI — Madison Place Service Corp. Syndicate, care of Rural Taxpayers federation, Groesbeck Community hall, H. J. Hooper, secretary, contemplates construction of a power plant equipped with diesel engines.

COLUMBUS GROVE, O.—Village, E. J. McCrate, mayor, is making survey in project for improving its sewage system. Champe, Finkbeiner & Associates, Toledo, O., engineers.

MANSFIELD, O.—City, Claude Hunter, mayor, is making survey and will soon have engineer's report in project for construction of improvements in its water distribution system. W. C. Statler, city engineer.

TORONTO, O.—Ohio Edison Co., 47 North Main street, Akron, O., Mr. Funk, chief engineer, has completed plans for a 52-foot addition to its power plant, costing about $3,500,000. Project involves installing a new 35,000-kilowatt turbo-generator and boiler. Will take bids on general contract within next two months. (Noted Feb. 13.)

Illinois

CAMPBELL HILL, ILL. — Egyptian Electric Co-operative Association Inc., T. Kueker, president, has received an REA allotment and soon will take bids on construction of 402 miles of rural electric power lines in six counties at cost of about $424,000.

Maryland

BALTIMORE—Charles T. Brandt Inc., Bush and Ridgley streets, manufacturer of sheet steel products, is receiving bids until March 15 for constructing a one-story addition to its factory.

Kentucky

RICHMOND, KY. — City, William O'Neill, mayor, is having a survey and estimates of cost made for constructing a municipal electric light and power plant.

Georgia

MANSFIELD, GA.—Town is receiving bids for construction of a waterworks system estimated to cost about $20,000. J. B. McCrary Co., Atlanta, Ga., consulting engineer.

South Carolina

GREENVILLE, S. C. — Gaylord Container Corp., 2820 South Eleventh street, St. Louis, has acquired plant and will remodel buildings for manufacturing corrugated fibreboard boxes. L. J. Rosenberg, Atlanta, Ga., general manager, to have charge of new plant.

Louisiana

LAFAYETTE, LA.—City, J. M. Roy, mayor, will receive bids March 21 for contracts No. 2 and 3 in construction of a light plant addition and installation of generating unit, switchboard and auxiliary equipment at total cost of approximately $150,000. Val E. Smith, city engineer.

LAKE CHARLES, LA. — Gulf States Utilities Co. has begun work on a plant enlargement costing $150,000, 25 x 60 feet, to house new equipment. Stone & Webster, Lake Charles, consulting engineers in project. (Noted Jan. 23.)

West Virginia

WEIRTON HEIGHTS, W. VA. — City, Carl Frankovitch, city solicitor, is making plans for constructing a water distributing system, including lines, elevated standpipe, and hydrants. Cost estimated to exceed $75,500. Consultant, Norman Parsons. Weirton Heights, Hancock county sanitary engineer.

Virginia

RICHMOND, VA. — United States Tobacco Co., Chicago, has plans under way for constructing a $1 250,000 plant at Petersburg Pike. T. Clark, Richmond, consulting engineer.

ROANOKE, VA. — American Viscose Corp., Marcus Hook, Pa., is having plans prepared for constructing an enlargement

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to its filter plant and installing four new filters and sedimentation basin.

Missouri

KANSAS CITY, MO.—City, T. D. Samuel Jr., chief engineer of water department, proposes to expend $200,000 for waterworks improvements, including new pumping station, and $150,000 for municipal air terminal improvements.

ROCKPORT, MO. — Atchison-Holt Electric co-operative, W. C. Seamman, president, is taking bids to 10 a.m., March 23, on the construction of approximately 138 miles of rural electric power lines in five counties. H. H. Henningsen Engineering Co., Omaha, Nebr., consultant. Certified check 5 per cent to accompany bids. (Noted Jan. 16.)

Oklahoma

AFTON, OKLA. — City, W. R. Denison, mayor, plans to construct a sewage disposal plant costing $28,000. A. J. Root, Quapaw, Okla., consulting engineer.

Texas

ABILENE, TEX. — City, W. W. Hair, mayor, proposes to construct a pumping station, spillways and pipe lines for Ft. Phantom Hill reservoir; cost is estimated at $531,612. Robert Hoppe, Abilene, consultant.

ALICE, TEX.—City proposes to modernize its sewage disposal plant and will submit $15,000 bond issue to finance project to voters.

DALLAS, TEX.—City, A. P. Rollins, director of public works, will soon call for bids for construction of a sanitary sewage disposal plant, including primary and secondary settling units, laboratory and recirculation chambers. R. M. Dixon, city sanitary sewage engineer.

HOUSTON, TEX. — Warren Petroleum Co., Tulsa, Okla., will construct a natural gasoline plant in Fairbanks field at cost of about $250,000. Plant will produce 10,000 gallons daily.

MATHIS, TEX.—Voters have approved bond issue to finance construction of proposed waterworks system, including steel tank and tower, pumping unit etc., at cost of about $65,000.

ORANGE, TEX. — Sabine Supply Co. proposes to construct a new two-story, 100 x 115-foot warehouse and storage plant costing $50,000. W. E. Simpson Co., San Antonio, Tex., architect.

Nebraska

CENTRAL CITY, NEBR. — Merrick County Rural Public Power district plans to erect rural power transmission lines totaling 112 miles. Carl Cox, Amarillo, Tex., consulting engineer.

HARTINGTON, NEBR. — Cedar-Knox Rural Public Power district, Julius Tigges, president, has awarded a contract to Elkhorn Construction Co., Norfolk, Nebr., for construction of about 125 miles rural electric lines costing $78,928. H. H. Henningsen Engineering Co., Omaha, Nebr., consulting engineer. (Noted Feb. 27.)

OMAHA, NEBR. — Loup River Public Power district takes bids until March 23 on a synchronous condenser complete with control cubicles for installation in a new substation.

OMAHA, NEBR. — Nebraska Power Co., J. E. Davidson, president, seeks state railway commission's approval in the proposed construction of 95 miles rural transmission lines in two counties. Clarence Minard, Omaha, company engineer.

TEKAMAH, NEBR. — Eastern Nebraska Public Power district, C. H. Gustafson, president, takes bids until 10 a.m., March 29, in the construction of 174 miles rural transmitting lines in two counties. Certified check 5 per cent to accompany bid. H. H. Henningsen Engineering Co., Omaha, Nebr., consulting engineer.

Iowa

VILLISCA, IOWA — Board of water and light trustees is making plans for construction of an addition to its power plant and installing an auxiliary engine at total cost of about $65,000. Will issue bonds to finance project. A. S. Harrington, Omaha, Nebr., consulting engineer.

WINTERSET, IOWA — City is receiving bids until 1:30 p.m., March 24, on waterworks improvements including dam, filtration plant, lines, and incidentals. Funds available total $162,000. Howard R. Green Co., Cedar Rapids, Iowa, consultant.

Colorado

BAILEY, COLO.—Intermountain Rural Electric association is asking for bids on construction of 100 miles of rural electric power transmitting lines estimated to cost $109,000. G. R. Fickel, Denver, consulting engineer.

Pacific Coast

ALTURAS, CALIF. — United States forest service, 1018 Phelan building, San Francisco, is asking bids on a wood-burning boiler, circulating pump and a compression tank.

EL CENTRO, CALIF. — Imperial irrigation district is asking bids due March 28 for constructing a hydroelectric plant on the All-American canal at estimated cost of more than $40,000. M. J. Dowd, El Centro, engineer.

LOS ANGELES — O'Keefe & Merritt, makers of stoves, will erect a one-story steel and brick warehouse, 80 x 120 feet, costing about $10,000.

SOUTH GATE, CALIF. — Walter DeLong, 8423 Southgate avenue, is building a galvanized iron machine shop, 40 x 80 feet, and will equip it.

BONNEVILLE, OREG.—United States engineer, Bonneville district, takes bids due March 28 for seven 20,000-kilovolt-ampere, 60-cycle, oil-immersed transformers costing about $100,000. Inventory 694-39-108.

SEATTLE — Western States Mines Inc., 562 Dexter Horton building, has been formed with $96,000 capital by M. W. Rowland and associates.

SEATTLE—Swift & Co., Chicago, proposes to build a processing and distributing plant, 150 x 320 feet, one-story, and including modern refrigerating and other food machinery.

TACOMA, WASH. — Monto-Oro Mining Co. Inc., 1117 Pacific avenue, has been organized with initial capital of $50,000 by R. R. McPherson and associates.

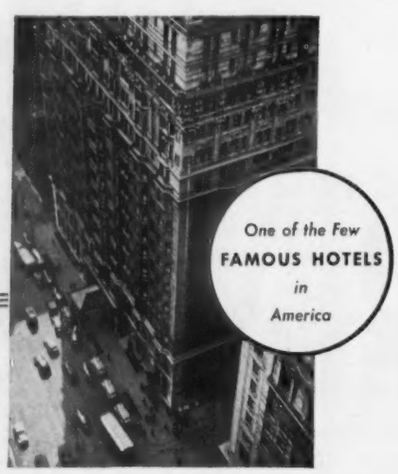
VANCOUVER, WASH.—Interstate Steel Corp., 222 Central building, has been incorporated with capital of $50,000 by T. W. Baker and associates.

Canada

BRANDON, MAN. — Central Refiners Ltd. has plans in progress for constructing a cracking unit costing more than $40,000 and sufficient to increase capacity by 1500 barrels daily.

REGINA, SASK. — Highways department, A. T. Proctor, minister, will soon accept bids on diesel road equipment for Saskatchewan province at cost of more than $20.000.

REGINA, SASK. — Scientific Equipment Laboratories Ltd., R. W. Ross, manager, plans to construct at cost of $75,000 a plant for extracting oil and other products from tar sands. Capacity, 25 tons daily.



CLAUDE H. BENNETT
General Manager

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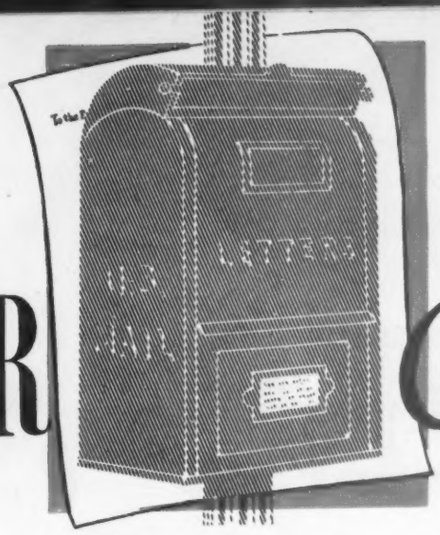
READER Comments



Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Steel House in Fire Test

To the Editor:

We had a fire in one of the houses in our Clairton project and certain steel items showed very considerable resistance. (This project is Colonial Village, in connection with Irvin Works of Carnegie-Illinois Steel Corp., described in STEEL, Nov. 21, 1938, page 38.)

The fire originated from a piece of defective BX wiring and burned four or five hours at night before it was discovered. The Ferro-Therm insulation prevented the fire from breaking through the outer walls or the roof. Indeed, it did not even get into the attic space. The steel stairs stood up perfectly and were not even warped after the fire.

Steel wardrobes would have protected clothing in all the second floor rooms. Such items of enameled steel as bathroom dados, shutters etc., were absolutely uninjured, aside from smoking, which readily washed off.

We think the fire definitely proved two things: The value of this construction as a preventive of conflagration, and an added security to life in providing safe exits.

ROYCE W. GILBERT

President,
Gilbert-Varker Inc.,
Pittsburgh

Good Sales Plan Imperative

To the Editor:

It has been said of the steel industry that it has done a great job of making more and better steel but that it has not paid enough attention to selling and distribution. My opinion is that the selling job has been done well, also.

But after listening to the preliminary report by John Younger on the effect of the machine on employment, given before the American Society of Tool Engineers at Detroit, I wondered how good a selling program the society could do. Professor Younger and his committee have made a fine start on the production job and the preliminary report has laid the groundwork for a factual report that promises to exhaust every source of information on this subject.

But how will the results of this research be sold to the public? At the Detroit meeting the preliminary report was heard by an audience which already knew at least the main fact, that machines make employment. Outside that circle there was an audience composed of readers of such publications as STEEL, which reported the meeting to groups who also know that the machine does not cause unemployment.

It is a most valuable contribution by the tool engineers to establish the truth by such a research. But how about the selling job? How will the result be passed on to those outside the circle? It is most difficult to overset an opinion so generally accepted as that men are displaced by machines. It is believed by newspaper editors, by college professors, by politicians, school teachers, doctors and a host of others who have to do with making public opinion and who pass on the erroneous belief to others.

Unless something along this line can be done, something to convince people of this class, little good will result from the valuable labors of this committee. It is propaganda, in the good sense, but perhaps will be looked on with suspicion of self interest.

A most valuable contribution will be a plan to get the facts over to people who make sentiment. Perhaps a possible avenue would be through leaders of labor organizations, who have considerable influence with their followers.

This necessary follow-up of the committee's work is worthy of as much study as the original search for facts. Without good salesmanship much of the value of the final report will be lost.

INTERESTED

Detroit

No Frontier in Sight

To the Editor:

Much talking has been done about the "last frontier" being reached in the present phase of American industry, with the implication that the road from here runs downhill after two or three centuries of constant upward advance. Yet even cursory reading of the current news of the day reveals vast fields for further advance.

I noted recently in STEEL the program of the American Road Builders' association for a billion dollar roadbuilding program for safety and economy and in another issue the needs of railroads for deferred improvements which amount to nearly a billion more.

The steel industry has been accused of having excess capacity, interpreted by the federal trade commission as a burden on steel costs. What is needed is some magic that will release the highway, railroad and other pressing needs so that the so-called excess capacity can be put to work. These two classes of steel consumers are mentioned only because they have appeared recently in the news. A dozen others might be cited. The last frontier will not be reached until the last need of mankind has been filled. That is a long time ahead.

OPTIMIST

Buffalo

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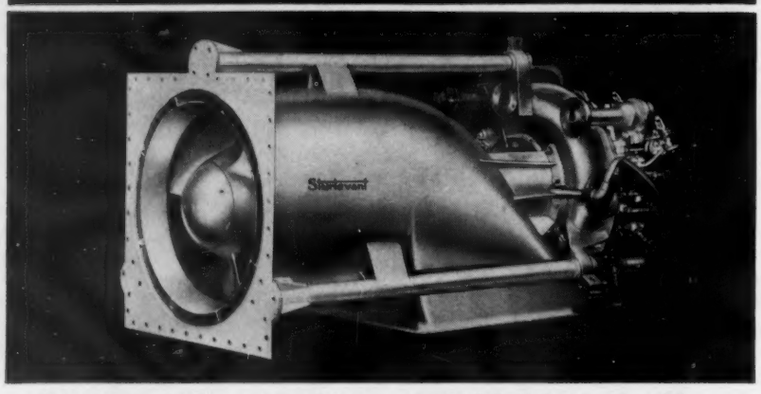

This is the axial flow turbine-driven mechanical draft fan developed by the Sturtevant Research Laboratories for use in marine service. It moves large volumes of air with extraordinary efficiency against static pressures up to 16" w.g. and has an overload capacity of 25" water gauge! This marine type fan is the forerunner of the Sturtevant Axiflo Pressure Fan featured in this advertisement.

Handles large air volumes against resistance— with high efficiency

INDUSTRY long has needed a highly efficient industrial fan of the axial flow or thrust type—designed for performance against wind and system resistance. And here it is—the radically new Sturtevant Axiflo Pressure Fan—that greatly reduces initial installation cost, cuts power consumption, saves space, in meeting a wide variety of fan applications!

This new fan is a notable achievement in fan engineering. In fact, it is the result of extensive research by the Sturtevant Research Laboratories, in developing the marine type Sturtevant Axial Flow Fan shown below, left, to meet extremely severe capacity, resistance, and efficiency requirements.

The Sturtevant Axiflo Pressure Fan has a mechanical efficiency of over 79%. It will overcome resistance up to 1½" water gauge. At present it is available in capacities up to 75,000 c.f.m. It is compact – space-saving. Rugged—designed for continuous operation.

Do not fail to investigate this outstanding fan. Write for catalog 444.

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